E. DELLE SEDIE

A COMPLETE METHOD OF SINGING

G. SCHIRMER NEW YORK

10-26-51

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A THEORETICAL AND PRACTICAL TREATISE
ON THE ART OF SINGING

Pr., net $3.00
(In U. S. A.)

G. SCHIRMER, INC., NEW YORK

PREFACE.

My preceding works, entitled "Esthethics of the Art of Singing and of the Melodrama," and "Vocal Art," filled no less than seven volumes. I now condense them to a single one, in order to make more readily accessible to the pupil at least a summary of all that I consider requisite for his complete musical and artistic education. And as he may perhaps desire to have some subjects presented in fuller detail in the course of his studies, he will find in this volume frequent references to my previous works; the aim and scope of which, as well as the actual conditions of the art of singing, I have stated in various prefaces to the aforesaid works; so I think it superfluous to speak again about them here. I will merely say that continued experience of my principles, as applied in teaching, both by myself and by other professors, has confirmed my opinion of their efficacy. I therefore confidently offer the public this new edition; hoping it will be favorably received by all who occupy themselves with the most beautiful of the fine arts.

FIRST PART.

FIRST LESSON.

On the Mechanism of the Voice.

The organs which produce the human voice act in a special manner. To facilitate their movements, it is necessary to know their structure and natural motions. For this reason we commence our lessons with an anatomo-physiological analysis of the vocal organs, assisted by the anatomical plates.

The notes accompanying them are those which Dr. Mandl has inserted in my treatise *L'Art Lyrique.*

Fig. I.

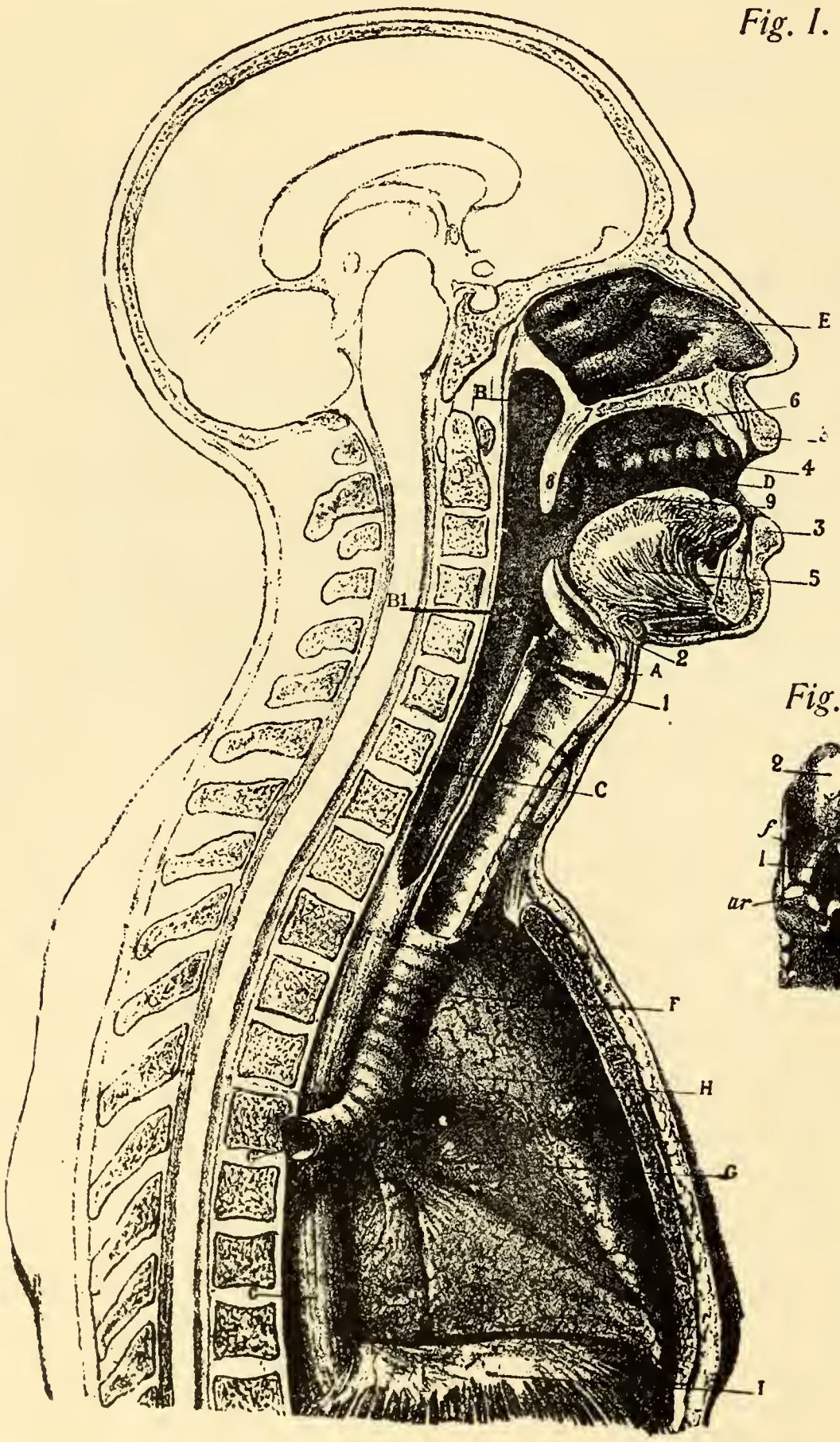


Fig. I.

The head and the thorax bisected.

A Larynx { 1 Vocal cords; 2 Epiglottis
B–B' Pharynx
C Œsophagus
D Oral cavity { 3 Lips; 4 Dental arches; 5 Tongue; 6 Palatine arch; 7 Soft palate; 8 Uvula; 9 Tonsils
E Nasal cavities
F Trachea
G Bronchial tubes.
H Lungs
I Diaphragm

Fig. II.

Fig. II.

The larynx viewed from above (open Glottis).

1 Vocal cords – *gl.* Glottis
– *ar* Arytenoid cartilages
2 Epiglottis – *f* False vocal cords.

THE LARYNX.

"The *larynx* (A, Fig. I) is situated in the centre of the fore part of the neck ; its shape is almost that of a triangular box open above and below. The protuberance caused by it in the throat of man is known as Adam's apple. This permanent opening of the larynx is supported by two walls consisting of strong cartilages. The inner part is lined with a mucous membrane and presents two horizontal folds, the vocal lips (1), commonly called *vocal cords*, whose movements are opposed, and whose tension, length and thickness produce the different tones.

"The *epiglottis* (2) is a lid fixed at the upper opening of the larynx ; by lowering itself during the action of swallowing, it prevents food from entering the cavity of the larynx."

Certain authors affirm that this organ exercises an influence on the resonance of the vocal tone, giving more fullness chiefly to the grave tones, and thus acting as a resonance-chamber of the larynx.

"The space between the vocal cords through which the air passes is called the *glottis* (Fig. II, *gl.*). The vocal cords are brought together, parted, distended or relaxed by the *arytenoid cartilages* (Fig. II, *ar.*); over the vocal cords there are two mucous folds called *false vocal cords* (*f*).

"The *pharynx* (B–B') is a cavity situated behind the mouth ; its ordinary shape is that of a flattened funnel with the base turned upward, while the narrower end opens into the larynx and the œsophagus (C). Its dimensions are subject to great variations, due partly to age, sex and general development, and partly to the extreme mobility of the larynx and the soft parts of the *oral cavity* (D).

"Three cavities communicate with the pharynx: The larynx, the oral cavity and the nasal cavities.

"The *oral cavity* has the shape of an oval box. It has an opening in front (the mouth); an inner wall formed by the lips (3), and the *dental arches* (4); two lateral walls formed by these arches and the cheeks; the lower side is formed mostly by the tongue (5) and the upper side by the *palatine arch* (6); lastly, a back wall formed by the *veil of the palate* (7), which is extremely mobile, and from the middle of which depends the *uvula* (8), while at the base of this latter, on each side, are the *tonsils* (9).

"The opening bounded by the veil of the palate and the root of the tongue, establishing communication between the oral cavity and pharynx, is called the *isthmus of the throat.*

"The *nasal cavities* (E) consist of three channels, the openings of which are called nostrils. There are the external and the internal nostrils; the latter communicate with the pharynx. These channels also communicate within the nose with other cavities situated among the bones of the head. The larynx communicates below directly with the *trachea* (F), which divides into the *bronchial tubes* (G), the final ramifications of which constitute the spongy tissue of the *lungs* (H). These organs are placed in the bony encasement of the *thorax*, composed of the *ribs*, the *collar-bone*, the *intercostal muscles*, and the *vertebral column.*

"They rest on the *diaphragm* (Fig. I, lett. l), the great horizontal muscle which separates the case of the thorax from the intestines."

NOTE. We insist on the necessity of attentively studying at least the 1st, 2d, 3d, 4th, 5th and 6th lessons of this book while studying the lessons in Solfeggio contained in Book I; for the pupil will then better be able to execute these practical studies in conformity with the best phonic conditions for the easy and correct production of vocal tones.

SECOND LESSON.

VOCAL TONE AND RESPIRATION.

THE voice is the result of vibrations of the vocal organs transmitted to the air. The ear perceives in tones three essential qualities : *Pitch* (acuteness or gravity), *intensity* (strength or weakness), and the *timbre.*

Pitch is determined by the number of vibrations in a given time. For the acute tones the number is greater than for the grave.

The amplitude of the vibrations, likewise calculated for a definite time, determines the *intensity* of the tone.

The shape of the sonorous body, or the way in which it is set in oscillation, determines the *timbre* of the tone; but for the voice, which acts like the wind-instruments provided with reed-pipes, the *timbre* is produced :

(1) By the pressure of air against the reed (vocal cords).

(2) By the shape given to the resonance-chamber.

The resonance-chamber of the voice is composed of the *pharynx* and the *neighboring cavities* (*the oral cavity*). On this subject TYNDALL (1) expresses himself thus:

"When the air is forced from the lungs through the slit which separates the vocal cords, they are thrown into vibration; by varying their tension, the rate of vibration is varied, and the sound changed in pitch. The vibrations of the vocal cords are practically unaffected by the resonance of the mouth, though we shall afterwards learn that this resonance, by reinforcing one or the other of the tones of the vocal cords, influences in a striking manner the clang-tint (*timbre*) of the voice."

(1) *Sound.* London: Longmans & Co.

The generative element of vocal sound being thus duly determined, we may assert that if the air, in ascending, causes the tone at the upper end of the larynx, where the vocal cords are situated, this same tone will gather resonance in the oral cavity situated above the larynx. Thus it is evident that the voice follows an ascending course both for the grave and the acute tones; consequently all pressure of air towards the trachea (F, Fig. I) would only be injurious to the timbre of the voice, destroying its flexibility and rendering the inflexions indispensable to sentiment and to musical expression almost impossible.

Thus, breathing constitutes the principal part in the correct production of the vocal tones.

Respiration is effected by two different movements; the first, called *inspiration*, draws the atmospheric air into the lungs.

This movement (depression) is produced by the contraction of the *diaphragm* and the dilation of the *thorax*; that of *expiration* by the contraction of the *chest* or *thorax* and the relaxation of the *diaphragm*. The two movements follow each other continually without interruption.

Expiration provides the *larynx* with the current of air necessary to give vibration to the vocal tone, which finds its resonance-chamber in the *oral cavity* and the *pharynx*.

To obtain this natural result, in its full extent and flexibility, we must avoid discharging from the mouth, by a violent *expiration*, the air set in vibration; we must allow time for the vibrations to propagate themselves in the resonance-chamber, so that each tone may be transmitted far, in all its intensity, by the air which surrounds us; the mouth then acts as a *speaking-trumpet*. A tone should be propelled from the resonance-chamber only by the regular and successive vibrations, i.e., by *continuous sound;* any movement contrary to this acoustic principle will unnecessarily fatigue the respiratory apparatus, and greatly impair the sonority, flexibility, and mellowness of the voice.

To emit the vocal tone spontaneously, the air must enter the lungs without any shock, and in such a way as to effect a complete average inspiration, so as to avoid *an excessive dilation of the thorax.*

First of all, this ungraceful movement causes a useless effort to the respiratory organs, provokes the escape of uncontrolled air, and diminishes *the resistance of the expiration*, which must always be slow and sustained. The inspiration ought to be renewed before expiration is altogether accomplished. Thus the jerky movements of the *inspiration*, which do not give the lungs time to absorb the ambient air, will be avoided. To draw the air into the lungs, a sudden and vigorous inspiration is not necessary; it suffices to raise the *sternum*, and this movement, aided by the contraction or lowering of the diaphragm (1, Fig. I), permits the lungs to expand and to absorb a quantity of air, as a moist sponge absorbs the liquid to which it is approached. Too forcible inspiration causes an immediate expiration; this causes a panting respiration.

NOTE. To accustom the chest to retain the air, in order to facilitate slow expiration, the following exercise will prove very useful. At first, let your respiration be of average fullness, conforming to what we said above, and as soon as the inspiration is effected, count in a low voice from 1, 2, 3, up to the number you can easily attain without tension and complete exhaustion of the breath. Be careful not to let any air escape between the articulation of the numbers. After a short rest repeat this experiment several times in succession, and the whole several times every day. This method accustoms you to control your respiration, and your chest to moderate the outflow of air, according to the exigencies of the singing voice. When you can easily execute this first exercise, try to pronounce short phrases, being still careful not to let any air escape between syllables. This exercise is to be first executed on any one of the notes most easily sung in the medium compass; after which, change the tone either higher or lower without exceeding the limits of the medium compass.

THIRD LESSON.

INTENSITY OF THE VOCAL TONE.

The intensity of the vocal tone may and should depend on the amplitude of the vowel, that is, on the resonance of the tone in the *oral cavity* and the *pharynx*, and on the force of the impulsion given to the vibrations of the tone.

DR. FOURNIÉ (1), in his work *Physiology of the voice and of the spoken word*, comparing the vocal cords to the lips, expresses himself thus: "The lips are formed of muscles which, while contracting, narrow the orifice of the mouth, giving to its edges a variable density according to the degree of contraction. . . . . The vocal cords greatly resemble the lips; and if the tones produced by the former are evidently the more harmonious, this is because these cords were created for the special purpose of producing musical tones."

Thus the intensity of the voice depends on the vigor with which the *vocal cords* make a tone vibrate, and consequently on the quantity of matter set in motion.

Pursuing the above comparison we may add, so as to render this theory more intelligible, that the lips while articulating the explosive consonants (labials), M, B, P, contract in such a manner as to effect the compression of a quantity of air, the intensity of which is more or less great according to the power of compression exercised by the lips. By this action we produce three explosive motions in three distinct grades of energy; the contracting lips come in contact and prevent the escape of air; but this motion is executed with a weaker tension for the syllable *ME*

(1) *Physiologie de la voix et de la parole.* Paris: Adrien Delahaye, Libraire-Éditeur.

than for *BE*, and when we pronounce the syllable *PE*, the force of contraction is still more vigorous. These three motions are identically the same, but they produce three perfectly distinct articulations, by the different force of the pressure of the lips. This force alters the physical conditions of the air in the mouth.

The more or less strong contraction of the vocal cords must evidently determine the intensity of the tone within limits corresponding to the degree of air-pressure.

So, if we consider the vocal instrument from this both natural and logical point of view, we shall avoid all violent efforts hazardous to the voice, and shall likewise attain all the force and intensity of which it is capable.

To obtain this result, we have only to use without exaggeration the vocal cords in the same sense as the lips when articulating the syllable *PE*. For the *mezzo-forte*, in which the *mean intensity* requires less vigorous contraction of the vocal cords, their movement may be compared to the motion of the lips in articulating the syllable *BE*. For the *piano* or *weak tone*, the syllable *ME* may serve as illustration.

It has been demonstrated that the air around us sustains our equilibrium; consequently the mouth is always full of it, even when no sound is emitted. *This* air is therefore the first to transmit the vocal tone, the production of which (independent of its prolongation, resulting from continued vibrations) must necessarily be instantaneous. Hence a violent expiration from the chest drives out the air in the mouth before the vocal tone has time to propagate its vibrations therein. For if the vocal tone vibrates in unison with the air filling the mouth, which air the force of expiration has expelled, the new air, notwithstanding its velocity, cannot come into vibration in the same conditions as that driven out; consequently, the voice will have less intensity and carrying-power. It is a mistake to think that, for singing, a great deal of breath must be used; it suffices to articulate clearly and with precision the tones which the "lips of the glottis" are required to produce.

Dr. Mandl, in the 2nd chapter of his scientific work *Hygiène de la voix*, has admirably explained, by the aid of a *laryngoscope*, the production of grave and acute tones. He writes: "When we examine the glottis by the aid of the laryngoscope, during the production of grave tones in the *chest-register of the voice* (which we call *lower register*), we see the glottis open to its full extent and the vocal cords vibrate in all their length. In the production of acute tones forming the *head-register* (which we call *upper register*), only the fore part of the vocal lips is set in vibration. The constriction is much less strong for low tones than in the high tones of the chest-register; this explains the relaxation which we feel while passing from the lower to the higher register."

If the air passes through the glottis too forcibly, the tone will suffer an alteration in timbre and intonation; and for the high notes, particularly, there is a risk of paralyzing the vibrating motion of the vocal cords; i.e., there will be absence of sound.

FOURTH LESSON.

Analysis of the Vocal Organs.

The vocal tone is formed by the articulated vowel.

Physicists have tried to explain the phenomena that produce the vowel. Among these eminent men, Helmholtz has established a remarkable theory on the timbres, and developed his experiments so far as to succeed in manufacturing an organ pronouncing the vowels *A, E, I, O, U.* (1).

In spite of this important discovery, the problem remained unsolved; every physicist examined these timbres from the standpoint of his own language. But on April 25, 1870, Mr. Koenig presented to the Academy of France the result of his experiments, with the aid of five new tuning-forks exactly an octave apart in pitch. The vowel U corresponds to the note *B*-flat (great *B♭* on the pianoforte); O, to (small) *b*-flat; A, to b^1-flat; E, to b^2-flat; and I, to b^3-flat. Thus he determined, in a positive and uniform manner, the tones corresponding to the five timbres or vowels. This is how he proved that his observation was correct. We know that when we set a tuning-fork in vibration, in order to hear its sound we must carry it to the ear. Mr. Koenig sets in vibration the first tuning-fork, carries it to his mouth, and slowly pronounces the five vowels, commencing with *A*; the fork remains mute up to the vowel *O* inclusive; but as soon as *U* is pronounced, the vibrations of the fork are reinforced by the sympathetic vibration of the air contained in the mouth, giving an immediate and very clear sound to the musical tone produced by its own vibrations. This experiment is repeated with the other tuning-forks, and each answers to the corresponding vowel.

Dr. G. B. Bolza (in his *Vocabularis Genetico-Etimologico* of the Italian language, published in Vienna in 1852), classed the vowels according to their acuteness in the same order as we find them in the tuning-forks of Mr. Koenig.

We thought it useful to dwell on this demonstration, because it contains a lesson of great importance and benefit for the singer. If Mr. Koenig's tuning-forks, when brought to the mouth, find the reinforcing body sympathetic with the vowel pronounced,

(1) The vowels *a, e, i, o, u,* must be pronounced as in Italian; viz: *ah, eh, ee, oh, oo.*

and to which they were attuned, it is evident that the air in the mouth vibrates in unison with the exterior motor. Thus the modifications made in the oral cavity by the constriction of the lips, must exercise a remarkable influence on the tone of the voice. The mouth may be considered as the adjustable resonance-chamber of the voice.

We have seen that great B-flat answers to the vowel *U;* but, as we know, in *female* and *tenor voices* this tone does not exist.

Having afterwards found that *I* corresponds to $b^3\flat$, it follows that we must set aside this vowel, because the corresponding tone does not belong to the human voice.

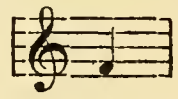
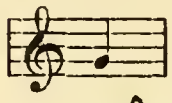
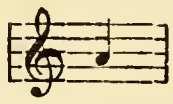
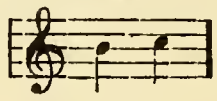
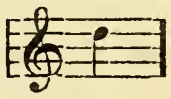
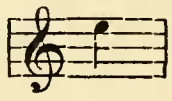
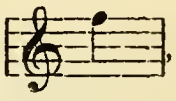
The voice therefore usually has at its disposal three typical vowels, *O*, *A*, and *E;* the *first* belongs to the *grave* tones, the *second* to the *medium*, and the *third* to the *high tones;* all intermediate modifications depend on these leading vowels.

The conclusions arrived at through Mr. Koenig's tuning-forks were a powerful incentive to further study of the motions of the lips, by means of which the timbres (vowels) may be variously shaded and transformed; for we must not forget that by modifying the timbres we can express human passions. We shall again call attention to this subject when studying the effects of the *crescendo* and *decrescendo.*

The principle of the transformation of the leading vowels by the configuration given to the mouth through the lips, was established some time ago by eminent physiologists, and for the study of the shades of the voice we may profit by their scientific observations. For the present we will simply observe that the two vowels *U* and *I* are almost out of the vocal diapason; nevertheless, they must be pronounced in speech.

These vowels are pronounced in a special way, i. e., they blend naturally with other vowels near which they lie (in the series), and conformably to the tone of the voice.

As each tone of the scale follows a phonetic order, varying according to pitch, we may assert that there are as many intermediary vowels as tones, considered with respect to their particular tonality.

If we execute a scale on the vowel *A*, for instance, and observe the successive phonetic order, we notice that the grave tones during their vibration give a timbre which approaches this same vowel *A*, somewhat broad. This *A* gradually grows sombre in rising towards the acute, up to F  ; at G  the vowel becomes a little clearer, while on A  this vowel again becomes close, its sound approaching open *O*. This vowel disappears at B and C  ; with D  it commences to approach the French diphthong *EU*, and on E  the timbre of this diphthong is established. The note F  , while preserving the preceding vowel, tends to approach the close French *E*. As the voice rises toward the acute, the higher tones develop this last vowel more and more. For all these shades we took the vowel *A* as our point of departure; but when we repeat the exercise with another vowel we meet with them similarly.

These vowel-shadings being the result of modifications made in the oral cavity (which is the mobile resonance-chamber of the voice) by means of the lips, it is clear that they undergo slight changes according to the shape of the walls of the mouth.

The types which we have mentioned, may nevertheless be considered as the main basis of the modifications we speak of.

FIFTH LESSON.

Movements of the Larynx and Soft Palate.

Having examined the vocal tone (the vowel) with regard to its sympathetic resonance in the mouth, we shall see under what homologous conditions it may be emitted with regard to the movements of the larynx. This organ, with relation to the singing voice, has two motions which ought to be taken into account, because of their influence on the timbres of the vocal tone. The first, called *general motion,* consists in raising the larynx; the second, called *particular motion,* consists in modifying the state of the vocal cords by the constriction of the muscles which adjust the aperture of the glottis.

Experience proves that, with regard to the timbre, the lowering of the larynx facilitates the emission of high notes, and its raising facilitates that of the grave ones.

Now, should we examine with a laryngoscope the act of emitting tone, an opinion opposite to mine may be formed. To see the vocal cords with this ingenious and useful apparatus, we must protrude the tongue in order to place near the soft palate a small mirror, so as to reflect the larynx. We have noticed that the tongue, when protruded, causes the rising of the larynx; thus this motion will give it an invariably raised position.

When the larynx is so raised we may emit high tones, but thin and shrill. It is true that we are disposed to raise it when we produce high tones, but if

we closely observe their timbre, we shall perceive that they are thin, and excessively sharp and shrill.

To sing correctly, it is necessary to give the voice a flexible, homogeneous and round tone.

Therefore, the rising of the larynx in high notes cannot be favorable to this production of vocal tones. I shall not dwell too long on a subject so often disputed, but will only point out the practical application of my theory.

As said above, the tongue when protruded causes the larynx to rise; if you execute this movement while singing a high tone, you will acknowledge what we have already stated—namely, that the tone produced has a thin, sharp, shrill timbre. During its continuation retract the tongue little by little, and the lowering of the larynx being effected under just the same conditions as that of the tongue, you will hear a progressive change in the timbre, which will gradually grow soft, flexible and round.

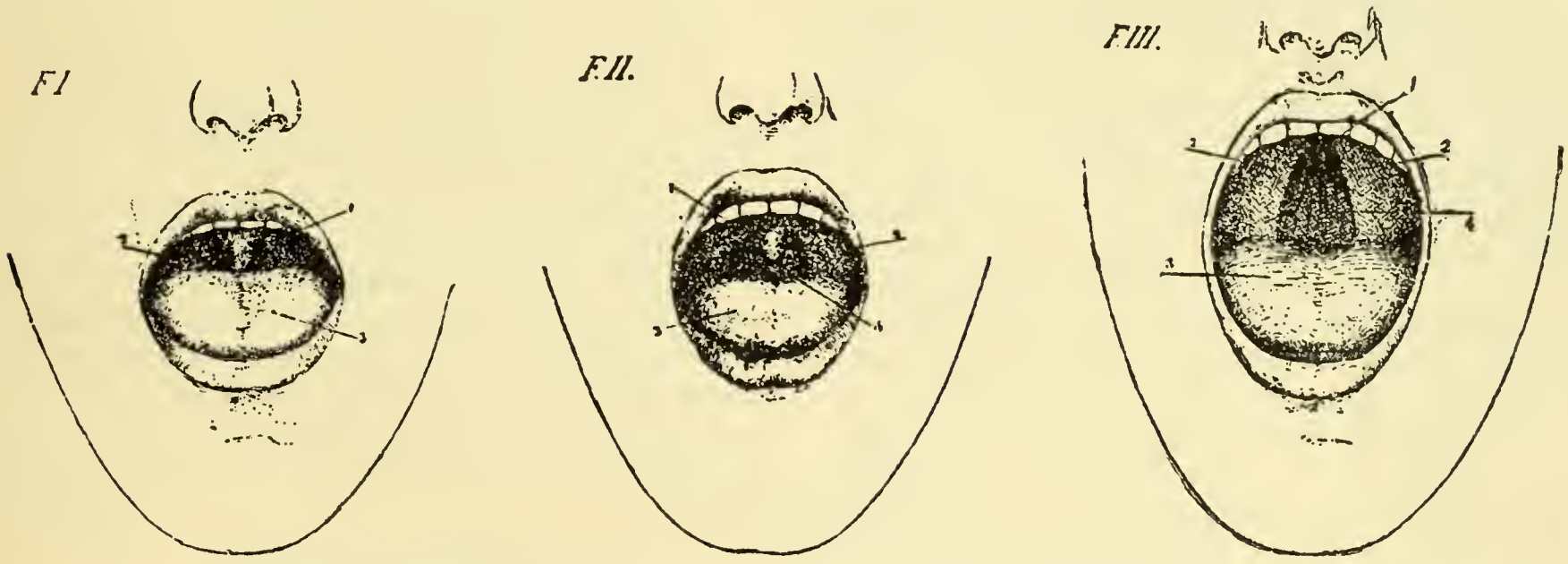
The same experiment, repeated without gradual preparation, will produce two distinct vowels,—the first one sharp and thin, the second full and soft.

the tongue, and above, by the soft palate and uvula (Fig. 1, D, 7, 8). At the sides are the two pillars of the soft palate. All these parts are extremely mobile, and under the influence of muscular action can either expand or contract the vocal tube; these motions act progressively according as the tones fall or rise in pitch.

The soft palate plays a considerable part in these movements, and, according to whether it is lowered or raised, the sonorous column may pass through the nasal cavities or through the mouth.

When the soft palate is lowered, it approaches the root of the tongue, and so narrows the sonorous tube; the tone then resounds both in the nasal and oral cavities. If, on the contrary, the soft palate rises, the bucco-nasal orifice will be almost closed, and the sound will escape from the mouth. This vocal tube does not contribute directly to the production of sound, but favors its formation by the dimensions it is susceptible of assuming.

The following illustrative plate will serve as a practical study for the movements of the soft palate.



1. Soft palate with the uvula.
2. Pillars of the soft palate.
3. Tongue.
4. Pharynx.

The application of this theory in a reverse sense, to the grave tones, will yield similar results; the tone emitted when the larynx is lowered will have a thick and veiled timbre, while the same tone emitted with the larynx raised will be resonant, broad and flexible.

According to this experiment, we conclude that the singer must lower the larynx for high tones, and raise it for grave ones.

These motions of the larynx, as shown by us, cause analogous movements of the *soft palate*, and both contribute largely to an easy and flexible emission of the vocal tone.

We have seen that the pharynx (Fig. I, B) constitutes the back part of the isthmus of the throat, the front part of which is formed, below, by the root of

In the above plate there are only the three main motions; on these depend all the gradations corresponding to the tones of the scale, and also to the movements of the larynx.

Fig. I presents the type of the grave tone. The soft palate lowered with the uvula (1) approaches the root of the tongue (3). The pillars of the soft palate (Fig. III, 2, 2) are lowered with the uvula and withdrawn from the middle, so that the pharynx (Fig. III, 4) is almost hidden.

This motion contracts the sonorous tube, and the tone resounds in the nasal cavities and in the pharyngo-buccal cavities, i. e., through the entire length of the pharynx.

Between the position indicated in Figs. I and II,

representing the type of the medium tones of the vocal scale, a series of ascending movements of the soft palate takes place in direct ratio to the height of the tones. The contraction of the isthmus of the throat being considerably less, the vocal tone finds its spontaneous resonance in the middle upper part of the pharynx, and also in the mouth.

Fig. III presents the type of the high tone. Dr. Fournié says: "The soft palate rises with the voice, and while the bucco-nasal orifice closes gradually, it prevents more and more the resounding of the voice in the nasal cavities. In the highest notes of the vocal scale the closing of this orifice is complete; and then we can see the pillars of the soft palate approaching each other towards the middle, and forming a real wall in front of the pharyngeal wall."

Fig. III presents very distinctly the position described by Dr. Fournié.

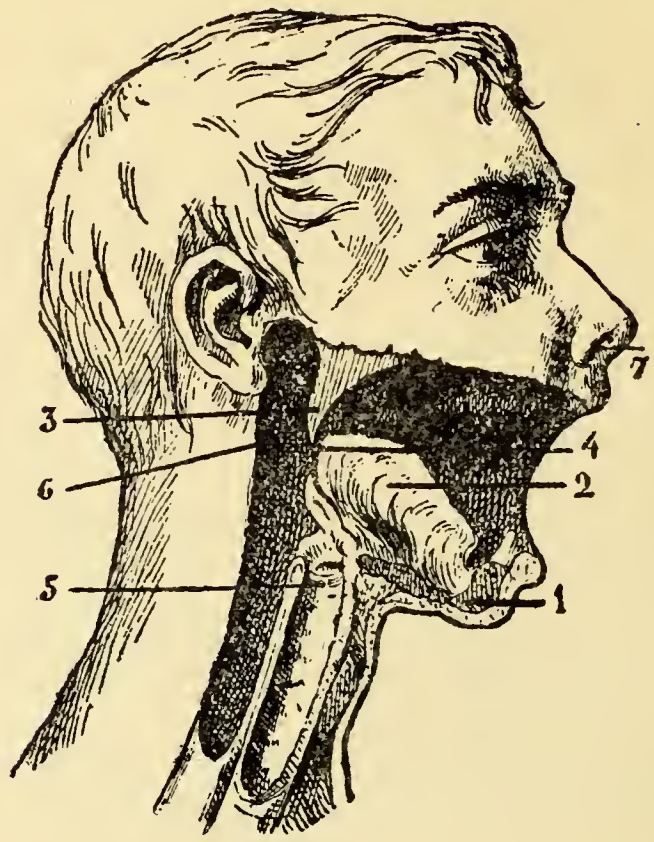
By this configuration of the sonorous tube, the voice resounds in the upper part of the pharynx and in the mouth up to the frontal sinus. These natural motions of the voice may be disturbed, delayed, or even neutralized by a too strong expiration, which may cause the tongue to rise.

The soft palate rises with a movement contrary to that of the larynx, following the same regular order of gradations; i. e., it rises as the tone rises, while the larynx, to give the voice a homogeneous and easy tone, should descend by like gradations.

Before finishing this explanation it is well to warn the pupil against lowering the under jaw too much, particularly for high tones.

The excessive lowering of the jaw considerably contracts the isthmus of the throat, and consequently the amplitude of the tonal vibrations.

The following plate shows the effect of this position.



1. Lower jaw.
2. Tongue.
3. Soft palate.
4. Isthmus of the throat.
5. Larynx.
6. Pharynx.
7. Nostrils.

Such an abnormal position of the mouth produces an imperfect and disagreeable timbre, the effects of which we have noticed above.

These faults are avoided when the jaws are moderately opened.

SIXTH LESSON.

The Registers of the Voice and the Attack of Tones.

The analysis of the vocal organ has shown that the voice takes on a special timbre corresponding to its pitch, both with reference to the tones composing the vocal scale, and to what concerns the blending of the tonal vowel with the vowel of the spoken word.

By strictly observing the theory of vocal tones, we shall readily obtain a homogeneous emission of the voice in all its compass.

This result causes us to inquire what the term *registers of the voice* means: for, having learned that the "ascending current of air passing the glottis, its force of pressure, the movements executed by the larynx, and the shapes assumed by the pharyngo-buccal cavity, produce a shock which gives rise to different timbres of the voice," one may ask: What is the sense of the expression "*registers,*" as applied to certain series of tones classed according to their various pitch?

Thanks to our preceding studies on the voice, we have seen that every tone may assume a timbre which, while specific, is homogeneous as compared to another tone of different pitch.

The earlier terms, *chest-register, medium register,* and *head-register,* may have had reason for existing so long as anatomical studies of the vocal organs had not admitted of establishing the correct physiology of the voice.

From the observations already made, we have noticed that the grave tones find their resonance in the whole length of the pharynx; and that by almost completely closing the oral passage, by raising the tongue and lowering the soft palate, the voice passes in great part through the nasal cavities; we now add that the voice when resounding in the whole pharynx finds a kind of sympathetic vibration in the higher part of the thorax.

This (very natural) phenomenon of resonance was in all probability the occasion, that the term *chest-tones* was applied to low notes.

But if we merely reflect, that the vocal tone

comes from the vocal cords, and that the chest, not being empty, cannot be considered as a resonance-chamber, the inaccuracy of this term will be apparent.

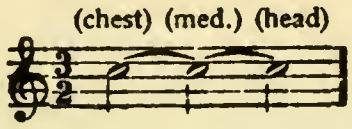
The resonance of tones belonging to the medium of the voice is produced, as already noticed, in the middle high part of the pharynx, and in the corresponding part of the mouth; these tones buzz (so to speak) in the throat. This fact explains sufficiently why the term *medium register,* or *throat-tones,* was given to this series.

Finally, by almost completely raising the soft palate, and drawing back the uvula, the passage of the vocal tones through the nasal cavities is entirely cut off, and they resound in the fore part of the mouth, and in the frontal sinus; these tones being of high pitch, find a resonance in the forehead, hence the term *head-tones.*

Having thus explained the origin of these three erroneous terms, we may add that they lead to movements contrary to the nature of the vocal organ, and that if in a voice we find tones called *transition notes* (the "break"), they are derivable solely from an abnormal direction (*reflection,* or *deflection*) given to the resonant tone. This defect may be avoided by pupils who have not yet sung; but with those who have contracted these faulty habits we must use means to eradicate them, or at least to lessen them.

In old methods of singing we find exercises intended for smoothly connecting the notes called *chest-notes* to those of the *medium,* and these latter to those of the *head;* this is called *blending the registers.*

These exercises (of which we give an example) consist of tied notes, sustained long enough to allow of a gradual change of timbre. The first note must be produced with the so-called *chest-register;* the second, of the same pitch as the first, must be transformed into the vocal timbre called *medium register;* and the third into the timbre called *head-register.* Example:



By continued practice of this fatiguing exercise singers often succeeded in blending these three gradations of the voice, and in rendering the tones of the entire compass a little more homogeneous. Thus a sort of mixed timbre was formed, corresponding to the *forte* of the acute tones, which were called also *chest-tones,* although they belonged to the series of acute tones called, when sung *piano, head-tones;* to a certain extent this resembles the effect of an immediate *crescendo* executed on a high note.

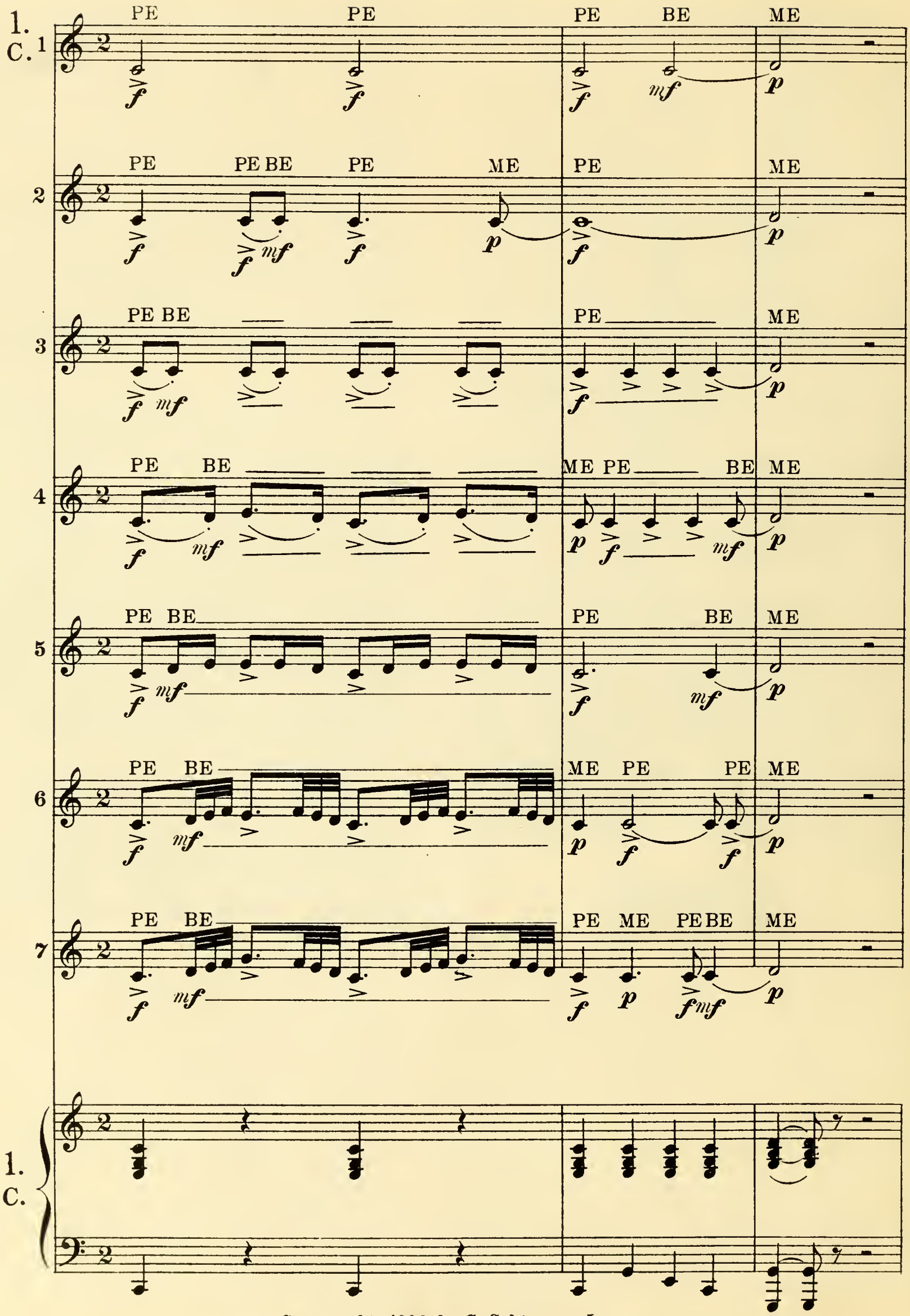
Our future course of study on the *crescendo* and *decrescendo* will practically prove that the exercise spoken of above simply amounts to different gradations of intensity in the tone, obtained by displacing the harmonics; for it is evident that, when the fundamental tone dominates, the timbre is full; but when we detach from the fundamental tone its higher harmonics, the timbre is comparatively weak.

Now we shall pass to the theory of the attack of tones; that is to say, the way to make them vibrate without incurring the defect of a feeble production called *humming.*

We have noticed that the vocal sound is produced by the shock of the air passing the glottis while expelled from the lungs, and in Lesson III we learned that the vocal cords act like the lips of the mouth, when the explosive consonants *P, B, M* are articulated; the movement corresponding to the *first* (p) produces the *forte;* to the *second* (b), the *mezzo forte;* and to the *third* (m), the *piano.* The vocal cords articulate, as it were, a *dry* syllable *ha,* in three different degrees of energy and constriction.

The following exercises were written to train the voice in this attack.

The degrees of constriction of the vocal cords vibrating to obtain a *forte,* must correspond to the movement of the lips as shown by the syllable *PE,* just as those for *BE* correspond to the *mezzo forte,* and those for *ME* to the *piano.* The syllables are placed over the notes, and correspond to the signs under them.



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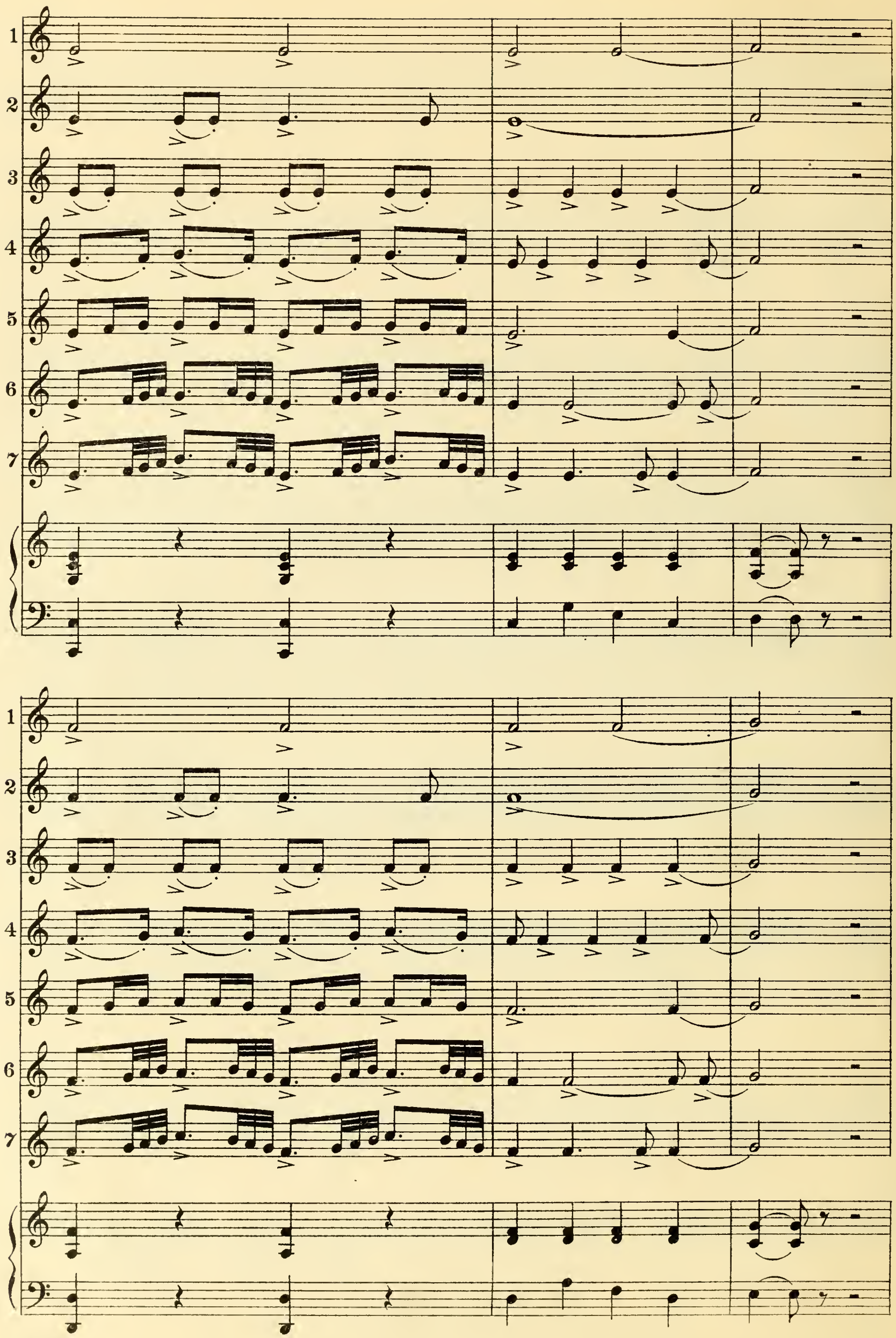
6 PE ME ME PE PE ME

7 PE BE PE ME PE BE ME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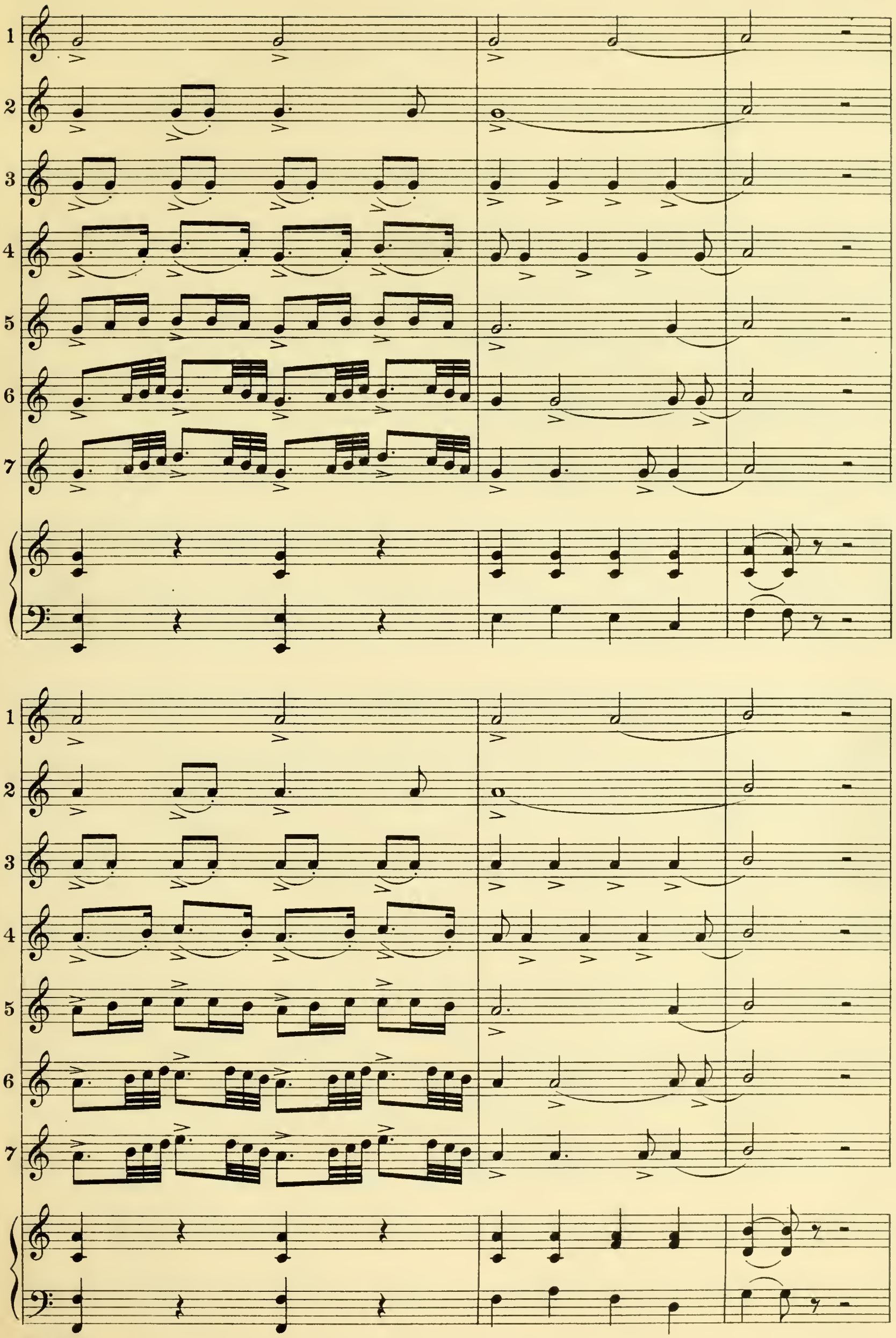
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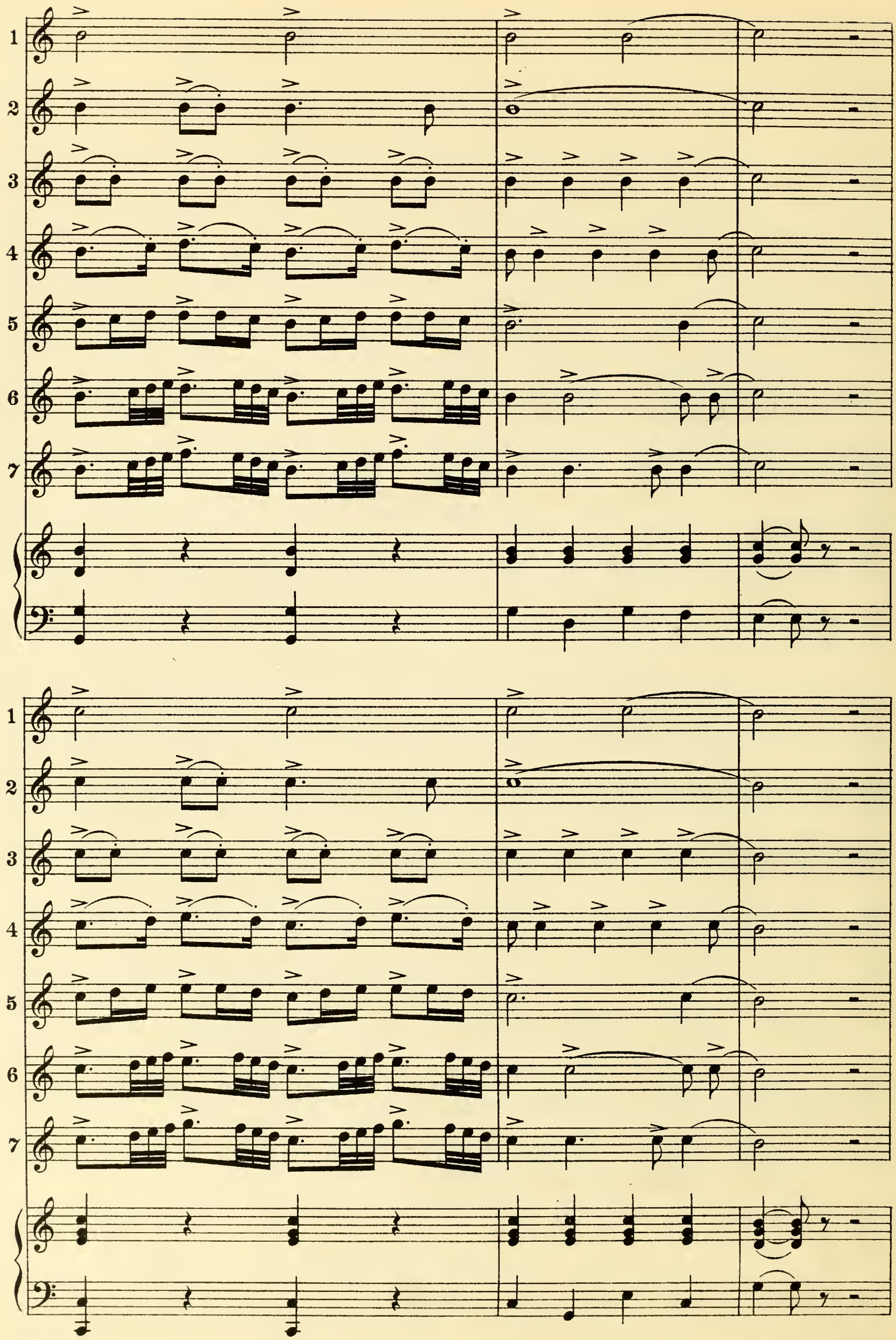
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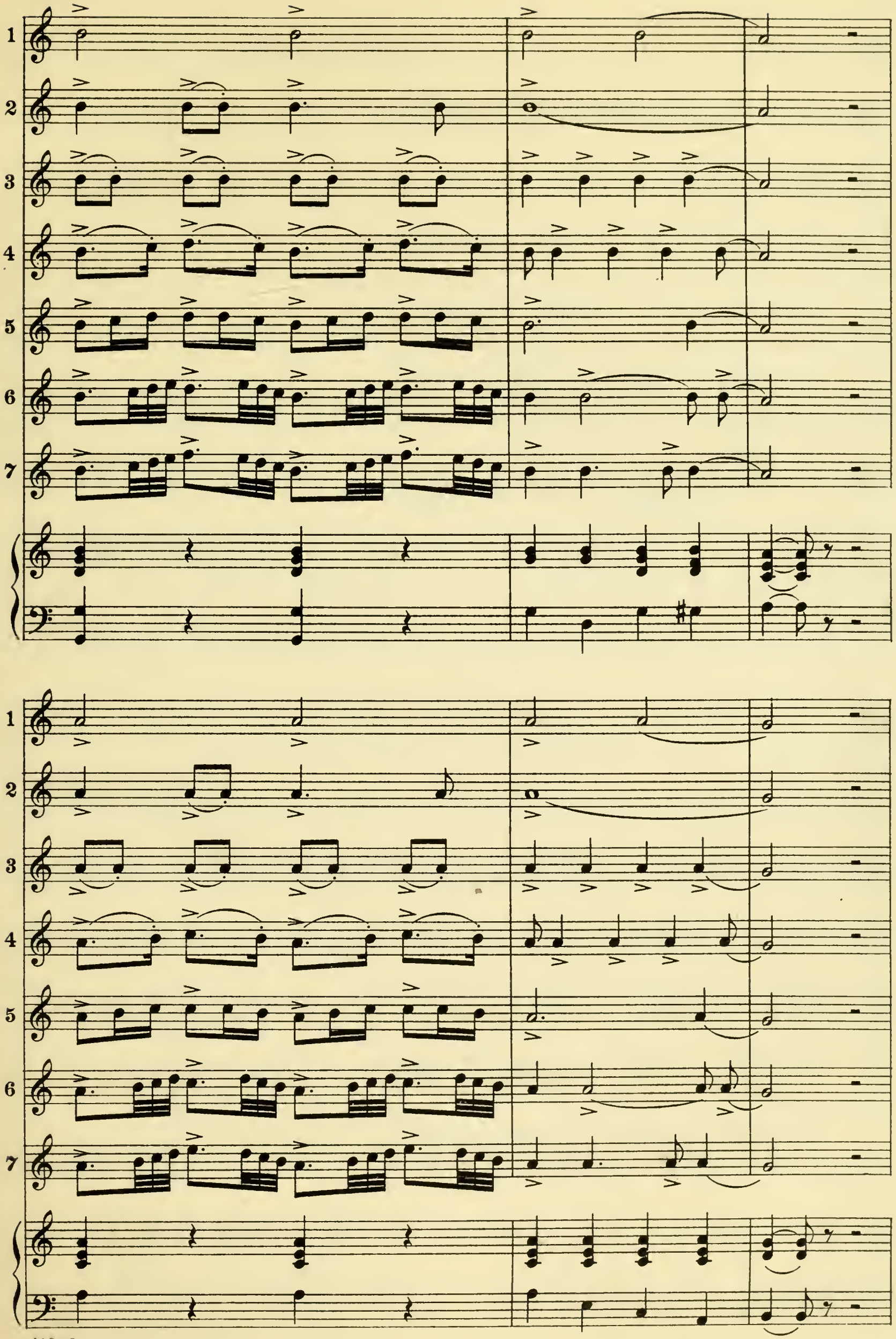
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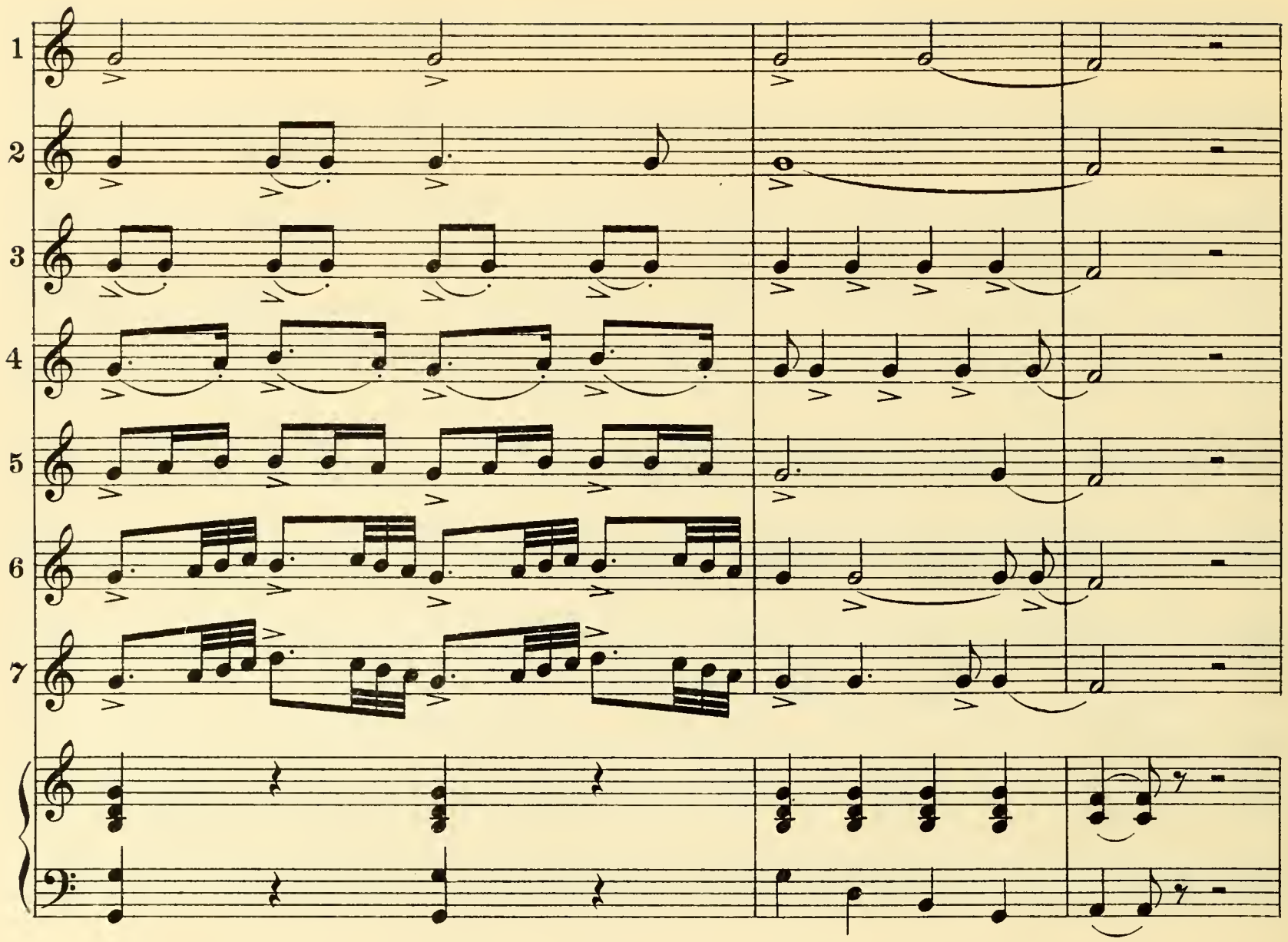
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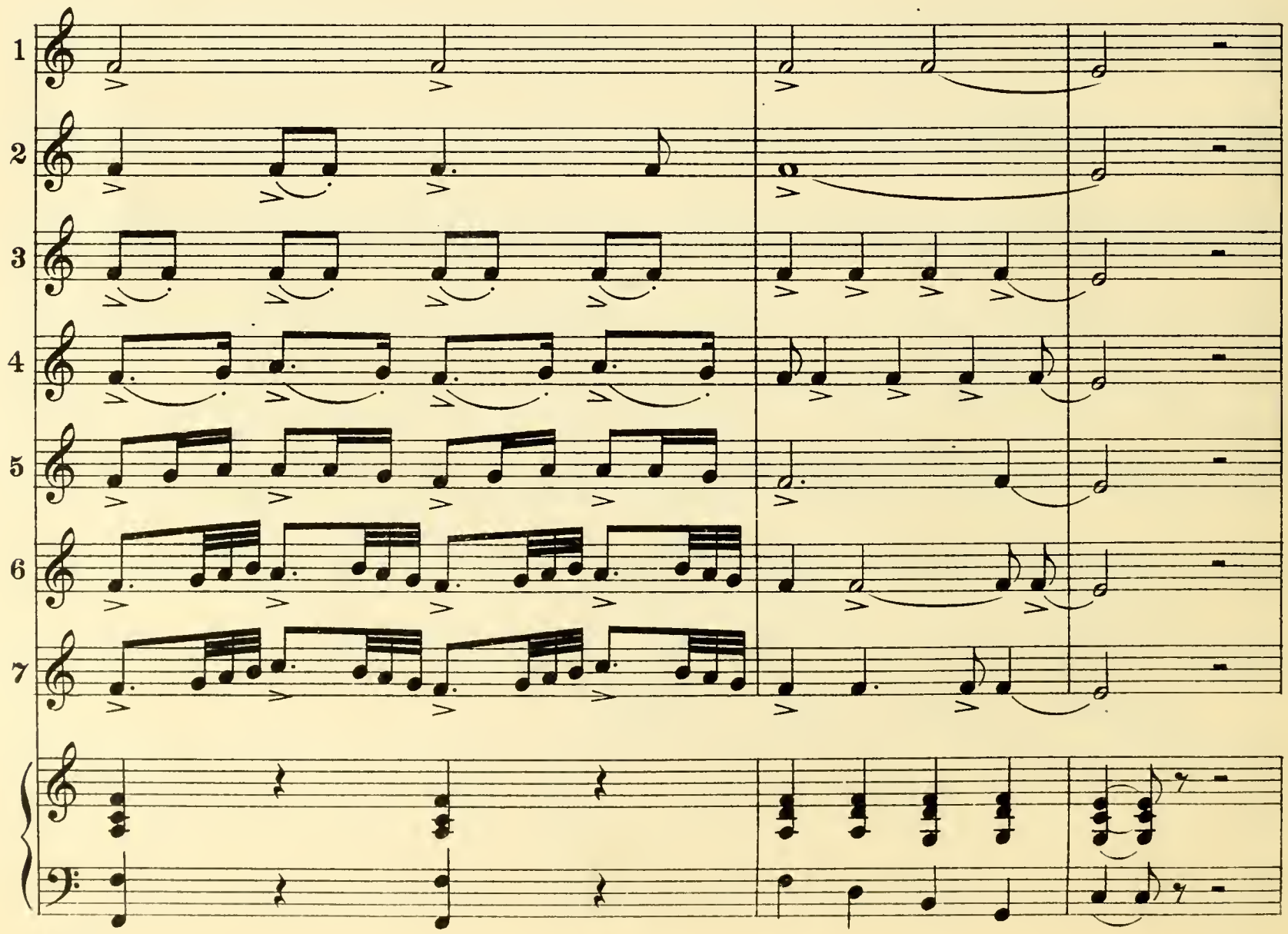
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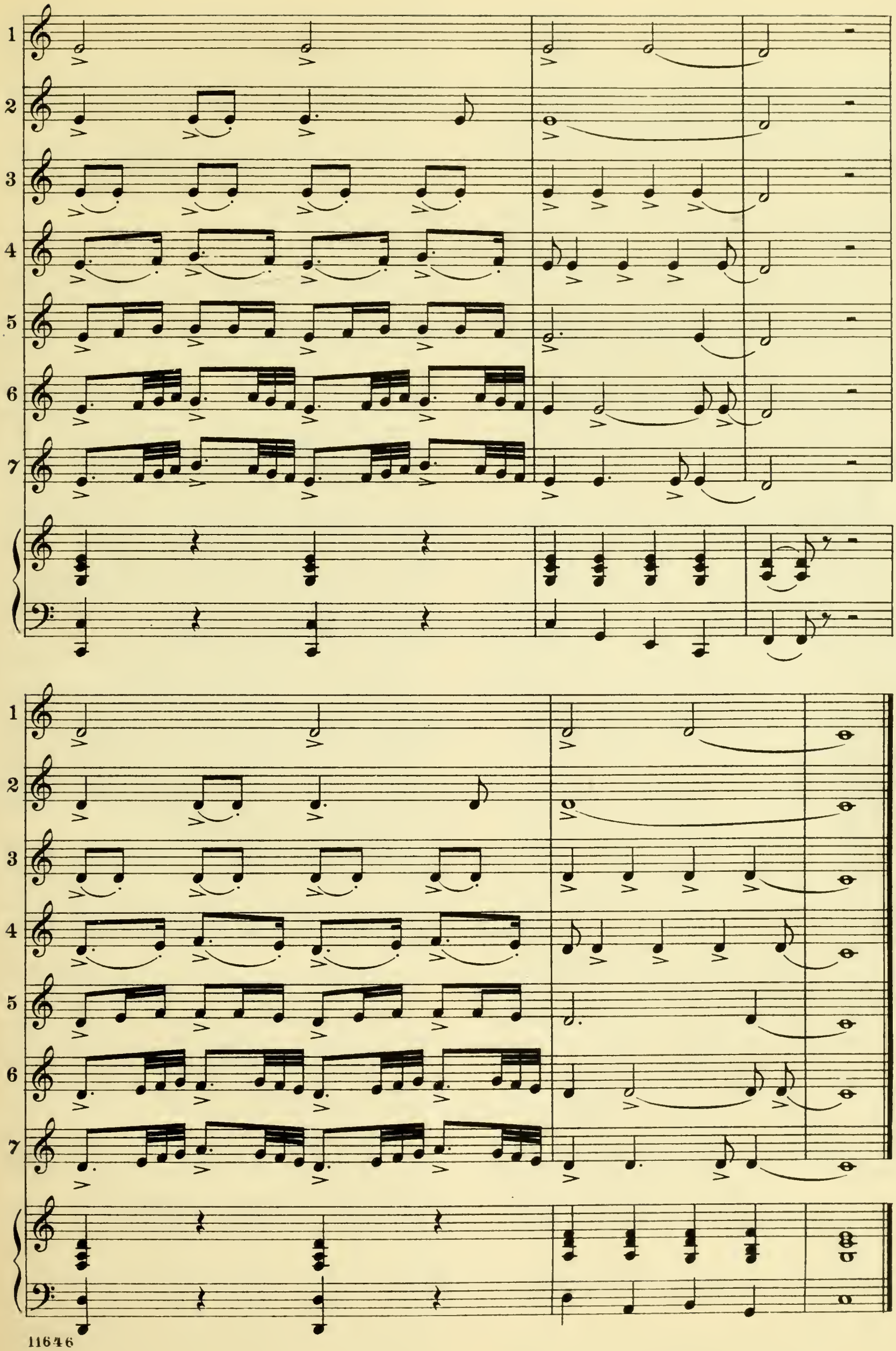
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SEVENTH LESSON.

Formation of the Vowels.

We have often spoken of the important influence of the vowels on the vocal tone. To correctly employ them for obtaining a spontaneous production of tones, we must proceed to a minute analysis of this phenomenon.

From the demonstration with the tuning-forks of Mr. Koenig, and according to the opinion of many skilful physiologists, we conclude that *A* occupies the centre of the human voice; consequently, its production ought to be most natural and easy; however, we observe that this vowel also requires a particular position of the organs of the mouth, which, if we propose to consider it as the primary type of the other vowels, we must bear in mind; for this vowel *A*, like the others, may be produced under various phonetic conditions. To facilitate study, for the sake of clearness, we shall take up the investigation of the vowels in succession, following the same order as in Lesson V of my *Vocal Art*.

The position of the vocal organs in pronouncing the letter *A*, which is considered the most easy and natural one for the production of tones, is the following:—

The root of the tongue takes an intermediate position in the pharynx, while the soft palate rises, bringing its pillars somewhat towards the middle of the tongue, which is hollowed in the centre, its tip touching the lower jaw near the teeth. This position is nearly that shown in Fig. II, Lesson V. This vowel possesses a medium pitch corresponding to the tuning-fork for b^1-flat of Mr. Koenig. Its phonetic accent is almost exactly that of the vowel *A* in the word FATHER.

Taking *A*, then, as a basis for our demonstration, according to the classification found in my *Vocal Art*, we will follow the movements shown there in the 1st group, in which, starting with *A*, we reach *U*, passing through the intermediate gradations of the vowels open *O* (as in ROCK), and close *O* (as in ROME); we must produce these vowels one after the other; at first, by preparing the corresponding motions separately; later, when these movements have become quite familiar, we shall renew the experiment in one breath, giving *A* its natural sound at once, and then, still sustaining this first tone, passing to the other vowels, open *O*, close *O*, and *U* (*OO*), without letting any air escape between them.

Open *O* requires the root of the tongue to be slightly drawn back and raised, while the mouth is brought gradually to an oval shape, never lowering the under jaw too much; then the sounds produced by the vocal cords will take immediately the true timbre of open *O*, as in the word ROCK; its pitch is approximately *small b*-flat.

To obtain the close *O*, the lips are only to be protruded more, this vowel then corresponding to *O* in the word ROME.

This position for close *O* will facilitate the production of *U*, for which the tongue must be drawn back and raised a little more (position somewhat similar to that in Fig. I), and the lips protruded so as to render the oral cavity as deep, and its opening as narrow, as possible, without closing it too far.

Such an adjustment of the oral cavity will produce the pharyngeal resonance necessary to form *U*, and thus induce the intonation of a low tone approximating to *great B*-flat.

For the pronunciation of *U*, a necessary observation is offered; sometimes the upper lip is protruded and folded like a bird's beak over the lower lip, which is drawn back; this improper position deadens the voice, as it almost entirely closes the mouth, and must be carefully avoided.

1st group, from *A* to *U*: ***a*—*o*** open—***o*** close—***u***.

The second group also commences with *A*, reaching *I* by passing through *E* open and $\bar{E}$ close.

Reassuming the position of the mouth for *A*, we have to bring the tongue forward a little with its centre near the palatine arch, at the same time slightly lowering its root; the corners of the mouth will be slightly opened, thus narrowing the aperture.

The pharyngo-buccal tube being so adjusted, the tone issuing from the larynx passes between the front part of the tongue and the palatine arch.

Thus *A* will be transformed, and take on the sound of open *E* as in the word BEND.

After this, by a stronger impulsion given to these movements, close *E*, as in the word TERM, will be produced; its pitch approaches that of b^2-flat.

Then, to reach *I*, the root of the tongue is lowered still more, and its centre approaches the palatine arch, while its tip almost touches the lower front teeth, and the lips are protruded a little.

This last vowel sympathizes with the tone b^3-flat of Mr. Koenig's set of tuning-forks; but as to its vocal production, it rather approaches close *E* or French *U;* for this tone is beyond the ordinary range of the human voice.

2d group, from *A* to *I*: ***a*—*e*** open—***e*** close—***i***.

The 3d group passes from *A* to French *U* (this group belongs more especially to the French language), and passes through the intermediate sounds of French *EU* open and close. The following demonstration will therefore be studied in conformity with the rules for French pronunciation.

Now, resuming the position for *A*, and bringing the lips together so as to narrow the orifice of the mouth, we pronounce open *EU*, because this vowel is that which most nearly approaches the natural timbre of the vocal tube, its position being almost identical with that for *A*, except as to the position of the lips; however, open *EU* as pronounced in the French word ÉPREUVE, requires the lips to be less protruded than for close *EU* in the word FEU. This last position of the mouth prepares that for French ***U*** in BRÛLE.

The tongue is more hollowed in the middle than for *EU;* the centre of its root is brought close to the palatine arch, and its tip is applied to the lower front teeth, and is raised a little. The pitch of this vowel is acute, since its form closely approaches that of close *E* and *I* (French).

3d group,

from *A* to French *U:* ***a*—*eu*** open—***eu*** close—***u***.

In Lesson IV we noticed that the movements of the larynx are associated with those of the root of the tongue, and that these latter exert a peculiar influence on the timbres of the voice; thus it is evident that the movements of the tongue indicated for the formation of the vowels, must be effected in general with its rear part, because those which require the action of the front part are used especially for the articulation of the consonants.

EIGHTH LESSON.

On the Timbres of the Voice.

The human voice is classed in two categories, the *articulated* voice and the *modulated* voice. To the former belongs all speech; to the latter, song; singing is usually associated with words, but articulation is not indispensable to it. Later we shall have to deal with this last form; for the present we limit our study to the *modulated* voice, its easy and correct emission forming the basis of declamatory song.

The question of the timbres is extremely complicated; for we must take into account:

(1.) The two principal timbres, the *close,* i. e. *sombre voice,* and the *open,* i. e. *clear voice.*

(2.) The particular timbres of each voice, and the characteristics which make us distinguish one from another.

(3.) The timbres which constitute the phonetic conditions in relation to the degrees of vocal pitch which we examined in Lesson IV.

(4.) The intermediate shades between the ten types examined, which shades are subject to the exigencies of the accents given to spoken words; this obliges us to describe each motion of the vocal organs proper to these types.

(5.) The special timbres required by the expression of the spoken word as associated with sentiment, and their relation to pitch. (See observation made in Lesson IV.)

(6.) The inflections given to the timbres of the voice to express correctly the emotions of the soul; for it is evident that love, hatred, sorrow, pleasure, complaint, reproach, prayer, menace, etc., cannot be expressed with a timbre of unvarying uniformity.

The most eminent physiologists have studied the question of the vocal timbres in connection with the formation of the timbres of musical instruments.

This study has given rise to various, and sometimes conflicting, opinions. Two principal timbres were recognized in the voice, namely, the *close* and the *open;* but the theories for their formation are not unanimously accepted. To familiarize the pupil as much as possible with this very important point, we shall briefly consider the different opinions which most nearly coincide.

The scientist Müller and Prof. Bataille agree that the *close timbre* is produced solely by the lowering of the larynx, which means that the opposite movement produces the *clear timbre.* Mr. Segond and Dr. Fournié say that the immobility of the larynx cannot be exclusively the cause of the sombre voice, because one can sing in the sombre timbre with the larynx raised to its utmost.

According to Dr. Fournié, this phenomenon is produced by the "resounding of the voice when the vocal tube is so adjusted that the dimensions of the cavity are as large as possible, and the orifices limiting this cavity contracted enough to oppose an easy emission of air."

Thus again it is the oral cavity with its neighboring cavities, which by their adjustment determine the shades of the timbres by reinforcing certain harmonics of the given tone.

The use of the two main timbres of which we have just spoken must be limited to the domain of expression and to the production of certain high tones; for if we employ either exclusively, we shall impair the sonority of the voice in some cases, and the easy production of tones in general, while causing the vocal organ considerable fatigue.

Independent of the two main timbres, i. e. the *close timbre* and the *open timbre,* an attentive study of the general timbres of the human voice becomes indispensable for uniting the dissimilar tones at the "break" in passing from one register to another.

The importance of such study may be easily appreciated. This theory seems to belong to a new school, but it was practised by the old masters of singing; and as that school has fallen into disuse, it is necessary to re-establish it with the exercises and theories based on the employment of vowels corresponding to the tones of the vocal scale.

Our aim is, therefore, to establish a *school of solfeggio* so arranged that it may be studied with the aid of vowels alone, or with the timbres corresponding to the several phonic conditions of intonation.

The utility of applying the phonic vowels to solfeggio is evident, and it does not hinder in any way the complete education of the musician; we affirm, on the contrary, that this didactic arrangement aids him to apply successfully in practice the primitive phonic properties of the vocal tone.

Although we have often spoken of the vowels corresponding to the tones of the vocal scale, we must again observe that this theory presents great difficulties when we try to put it into practice: the slight modifications made in the initial vowel by the different tones of the scale are so minute, that the ear could hardly perceive them, if not aided by precise estimates and explanations. An exact perception of these delicate shades

will be most easily promoted by the master's practical demonstration; nevertheless, it is necessary to explain the matter here as far as possible.

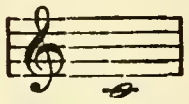
We shall therefore proceed by comparative examples. The human voice commands a series of tones of from 4 to 5 octaves, taking the sum of the compass of different voices. These different voices possess specific characteristics; the *Soprano, Mezzo-Soprano,* and *Contralto,* for females, and for males the *Light Tenor, Robust Tenor, Barytone,* and *Bass.* Their peculiar timbres make us distinguish their different character; but all, in their respective scales (compass), undergo similar shadings of the vowel, according to the tonal pitch and the inflections peculiar to expression and sentiment.

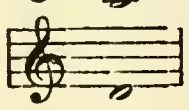
The vowels corresponding to the pitch of the vocal tones (as shown in the following comparative table), will be identical in all the voices, excepting a few modifications required by the specific character of each voice.

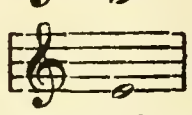
COMPARATIVE TABLE

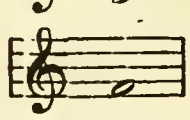
OF THE PHONIC SHADES PROPER TO THE VOCAL SCALE.

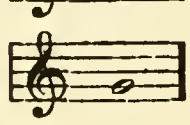
The words placed opposite the notes serve to indicate the phonic accent of the vowel corresponding to the vocal tone. In each WORD *the vowel is marked by the same special sign as the single* VOWEL *preceding.*

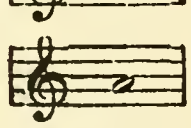

ā *open, as in the word . . . . .* Bāsk

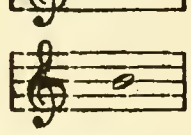

a̲ *semi-obscure, as in the word . . . .* Fa̲tner

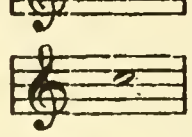

ā *close, as the final a in . . . . . .* Dramā

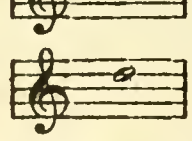

â *grave, as in the word . . . . .* Was

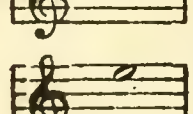

ā *open, as in the word . . . . . .* Bāsk

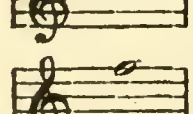

â *grave, as in the word. . . . . .* Wâs

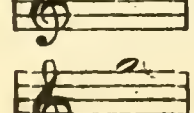

ō *close, as in the word . . . . . .* Ōpinion


ô *grave (a̲w in law), as in the Ital. w. .* Dôlo


e̲u *close, as in the French word. .* Jēune


e̲u *grave, as in the French word. .* Fe̲u


ē *close (ē in led), as in the French word* Naturē


e̲ *close (u̲ in but), as in the French word* Re̲frain

The necessary instructions for the compass peculiar to each voice, and the way to develop it, will be found in the chapter *Advice to singers intending to become professors,* in my treatise on *Vocal Art.*

For the present we will only remark that each voice has, under ordinary conditions, a compass of from 12 to 14 diatonic tones. We shall therefore limit our demonstration to the range of 12 diatonic tones, because the extreme low tones, as well as the extreme high ones, have almost the same shade as the next note above or below, accenting the timbre of this latter a little more; thus, in the high tone, the vowel is closer, whereas in the lower ones it is broader, approaching either *O* or *U* according to the class of the voice.

We add to the above comparative table a graphic demonstration, dividing the 12 diatonic tones into four series following each other in ascending diatonic succession. (See next page.)

The 1st series includes the first six notes of the scale of C, in four sections.

The 2nd starts with A and extends to the following C, in two sections.

The 3rd starts with C of the 2nd series, and stops at the following E, forming two sections.

The 4th series, also in two sections, starts with E and extends to G.

We see that the *fifth* corresponds to the vowel of the *tonic*, and that the sixth takes the phonic character of the *fourth.* This is the reason that, in the example in question, we divided the 1st series into four sections. By this arrangement we wished to call the pupil's attention to the very delicate shades which change the initial vowel of this series.

Before passing to the application of the following exercise, the pupil must carefully study the tones which result from the vowels, in conformity with the comparative table, so as to apply them with precision to the musical notes with which they are united.

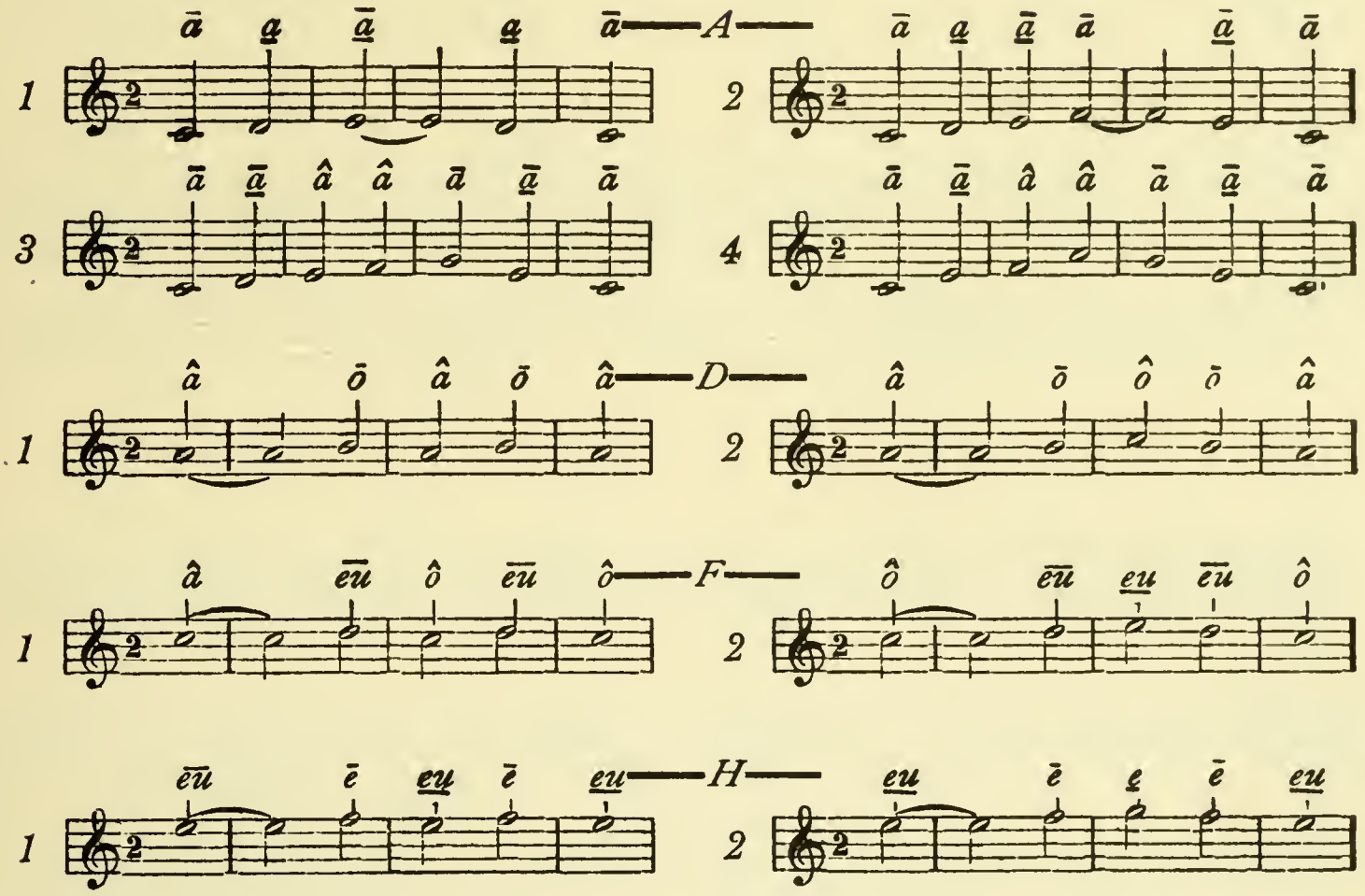
These exercises will be more fully developed in the studies which follow this first demonstration. We should not pass to the study of the intervals until the phonetic vowels corresponding to the tones of the scale can be employed without the slightest uncertainty concerning their formation.

We shall then be convinced of the advantage of such a method for the production of vocal tone, and of the facility of obtaining the necessary modulations for correctly rendering the expression required by the emotions. We shall also be convinced that the voice cannot be supported or posed without detriment to the timbre; for it must be sustained by the pressure of air in the wind-pipes of the trachea and larynx.

To render our demonstration more intelligible, we think it well to examine the tones of the scale in their diatonic succession, more particularly as the shades which divide the semitones are not very noticeable; however, their gradations will be explained hereafter.

For sharped notes the vowel corresponding to the natural tone of the same name slightly approaches the vowel of the following tone; the contrary is the case with flatted notes. To facilitate this study we

place the sign ♯ after the vowel of the sound marked over the note which is sharped, while in the case of flatted notes the ♭ will be placed before the phonic vowel.



EXPLANATORY TABLE

OF THE FOLLOWING EXERCISES.

A Series I.
1. First section.
2. Second "
3. Third "
4. Fourth "

B The four sections combined.

C Summary of Series I.

D Series II.
1. First section.
2. Second "

E Summary of Series I and II.

F Series III.
1. First section.
2. Second "

G Summary of Series I, II, and III.

H Series IV.
1. First section.
2. Second "

I Summary of Series I, II, III, and IV.

K Major and Minor Scales in the four Series

1. A

2. C.

1. B

C

ā a ā â ā â a ā

1. D

â ___ ō â ō â

2.

â ___ ō ô ō â

E

ā a ā â ā â ā â ā â ā â ō ô ___ ō â ā â ā a ā

1. F

ô ___ ēū ô ēū ô

2.

ô ___ ēū ēū ēū ô

G ā a ā â ā â ō ā ā â

ō ô ēu eu ô ēu eu ō â ā ā

1. H eu ē eu ē eu

2. eu ē e ē eu

I ā a ā â ā â ō ô ēu ô

ô ēu eu ē eu e ē ēu ô ēu ō

K

3.
C m.

C.

4.
D ♭.

5.
D m.

Andante.

6.
D.

ô ēū eu ē

Andante sostenuto.

ā â ā â ō ô ēū eu ē a ā

7.
E♭.

ô ēū eu ō ā â a ā ā

Andante sostenuto.

ā â ā â ō ô ēū eu e a ā

8.
E♭m.

ô ēū eu beu bô ō ā â a ā ā

Lento.

9.
E.

ā ō â ô

ā ēu ō ā

ā a ā ō â

ô eu â ô â a

eu ē eu

Lento.

10.
E m.

ā ō â ô

ā o♯ ēū♯ ō ā

ā a♯ ā ō â

ô ēū♯ eu ēū♯ â ô â a♯

a♯ o♯ eu ē eu

Andantino.

â ā â ō ô ēū ēu ā a ā

11. F.

Tasto Solo.

ô ō â â ā ā â

Tasto Solo.

Andantino.

â ā â ō ô ēū ēu ē ēeu ā a ā

12. F m.

a ā ô ō â â ā ā â

Andante.

13.
F♯.

â ā â ō ô ēu eu o ēu

ēu eu â ā a ā â ō â

Andante.

14.
F♯ m.

â ā â ō ô ēu♯ eu♯ ō ēu

ēu eu♯ â ā a ā â ō â

Andante sostenuto.

15.
Gb.

Andante sostenuto.

16.
G.

Andante sostenuto.

17.
Gm.

ô eu ō â â ā a ā eū ā

Andante sostenuto.

18.
G♯m.

ā â ō ô eū eu eu♯ ē ô ô ō â eū

ô eū ô ō â â ā a ā ô eū â ō â ā ô â

Largo.

19.
A♭.

â ō ô eū eu ē ā â ā a ā

Largo.

20.
A♭m.

â ō ô ēu eu ē ā â ā a ā

Andantino.

21.
A.

â ō ô ēu eu

ā â ā a ā

eu ē

Andantino.

22.
Am.

â ō ô ēu eu ā â ā a ā

eu ē

23.
A♯m.

â ō ô ēu eu ē ā â ā

a ā

24.
B♭.

ō â ā â a a ā ô eū

eu e e

25.
B♭m.

ō â ā â a a ā ô eū

eu e e

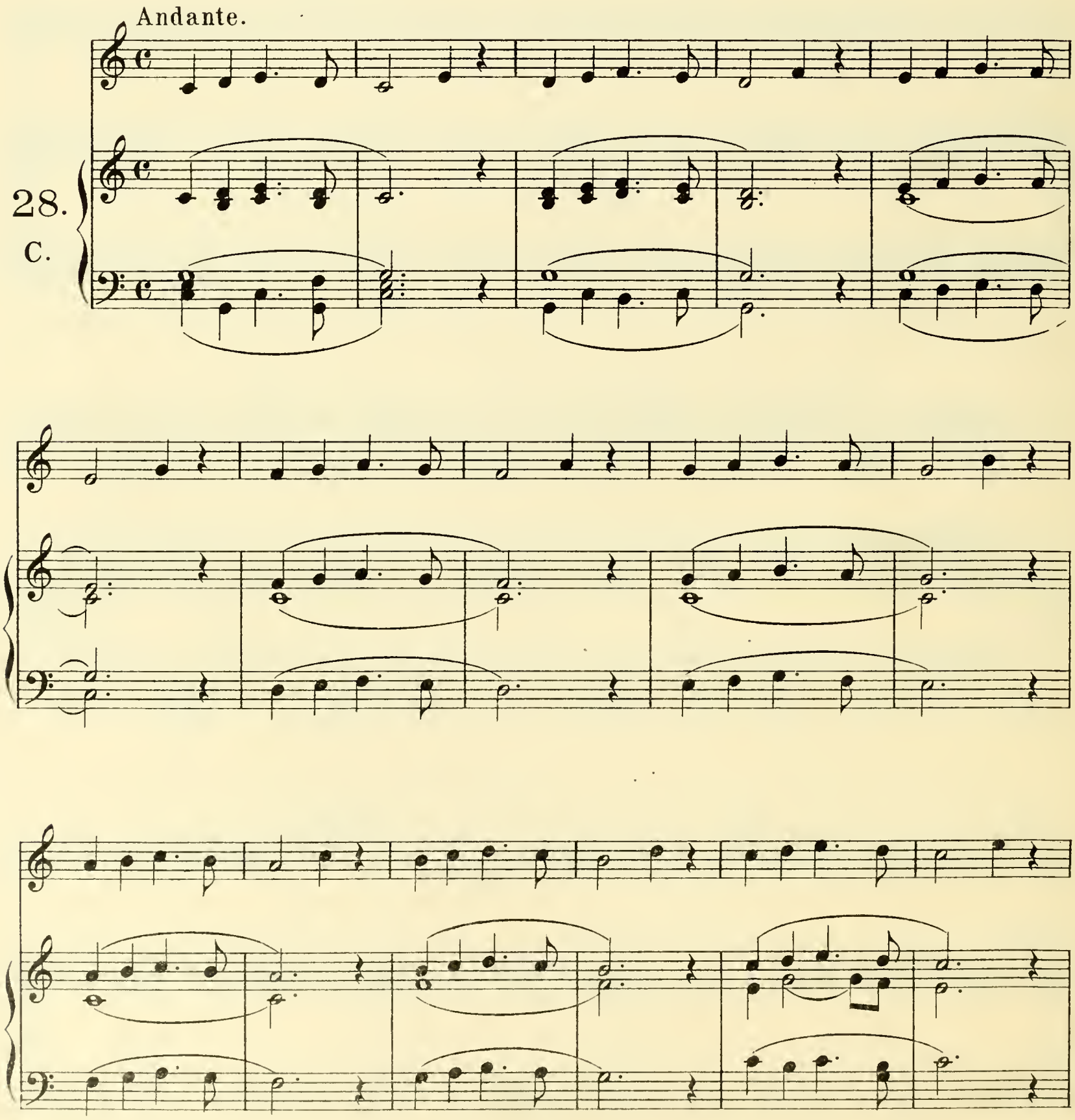
26.
B.

27.
Bm.

Ninth Lesson

The phonic intervals.

The object of our preceding studies was to lead the pupil to the practical production of the vocal tones under the phonic conditions peculiar to each with regard to their pitch. In this lesson we shall continue the same study on broader lines. From the diatonic scale we shall pass to the *intervals,* preserving the same didactic arrangement followed in the preceding exercises. For this study it is necessary to practise the *intervals* in their most regular and homogeneous phonic conditions; that is, all tones must preserve a correct timbre while undergoing the changes required by the changing pitch. In order to facilitate this study, we shall proceed by guide and skip in the first exercise of each *interval.*

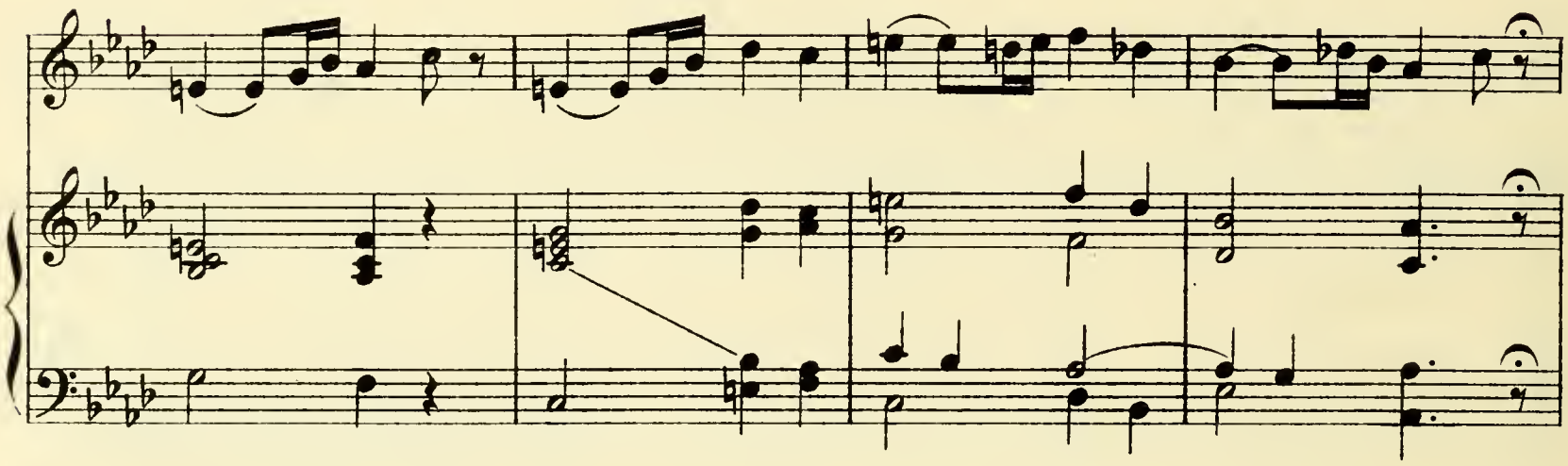


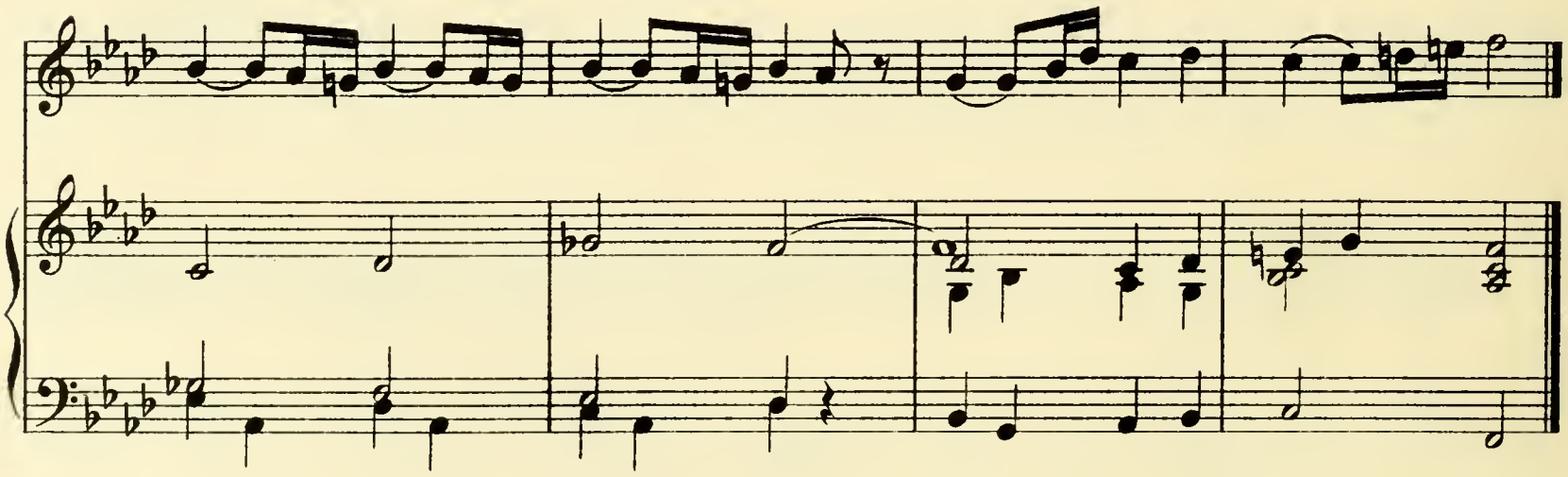
Moderato.

29. C.

Andante.

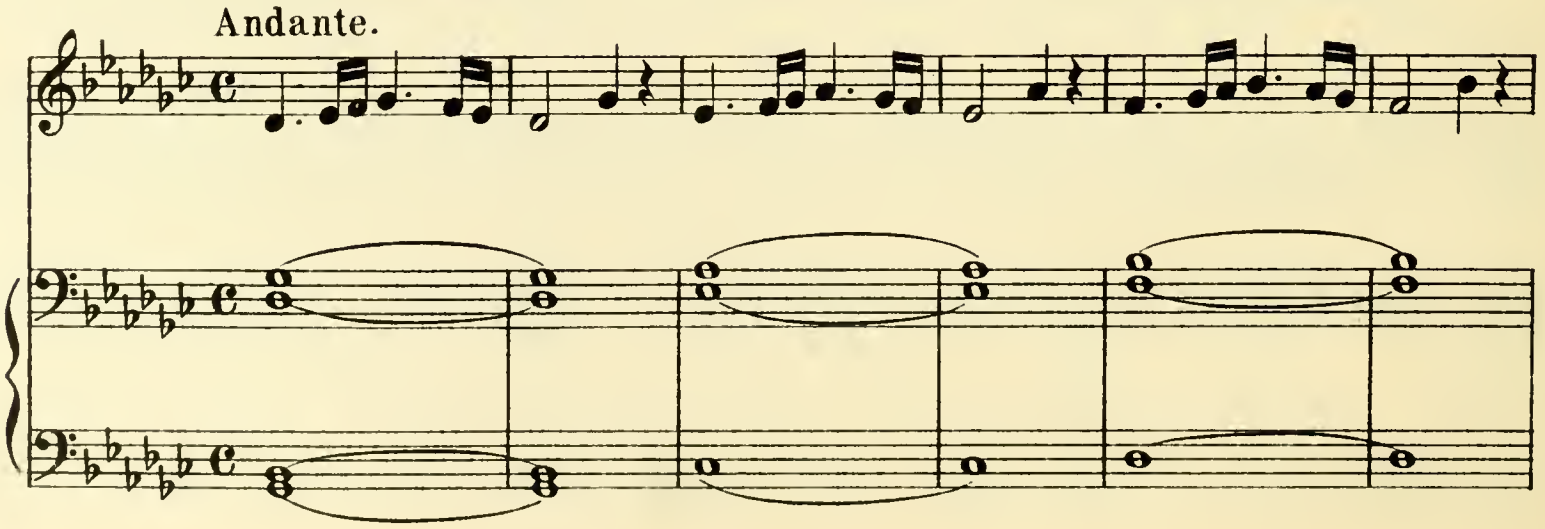
30.
Fm.

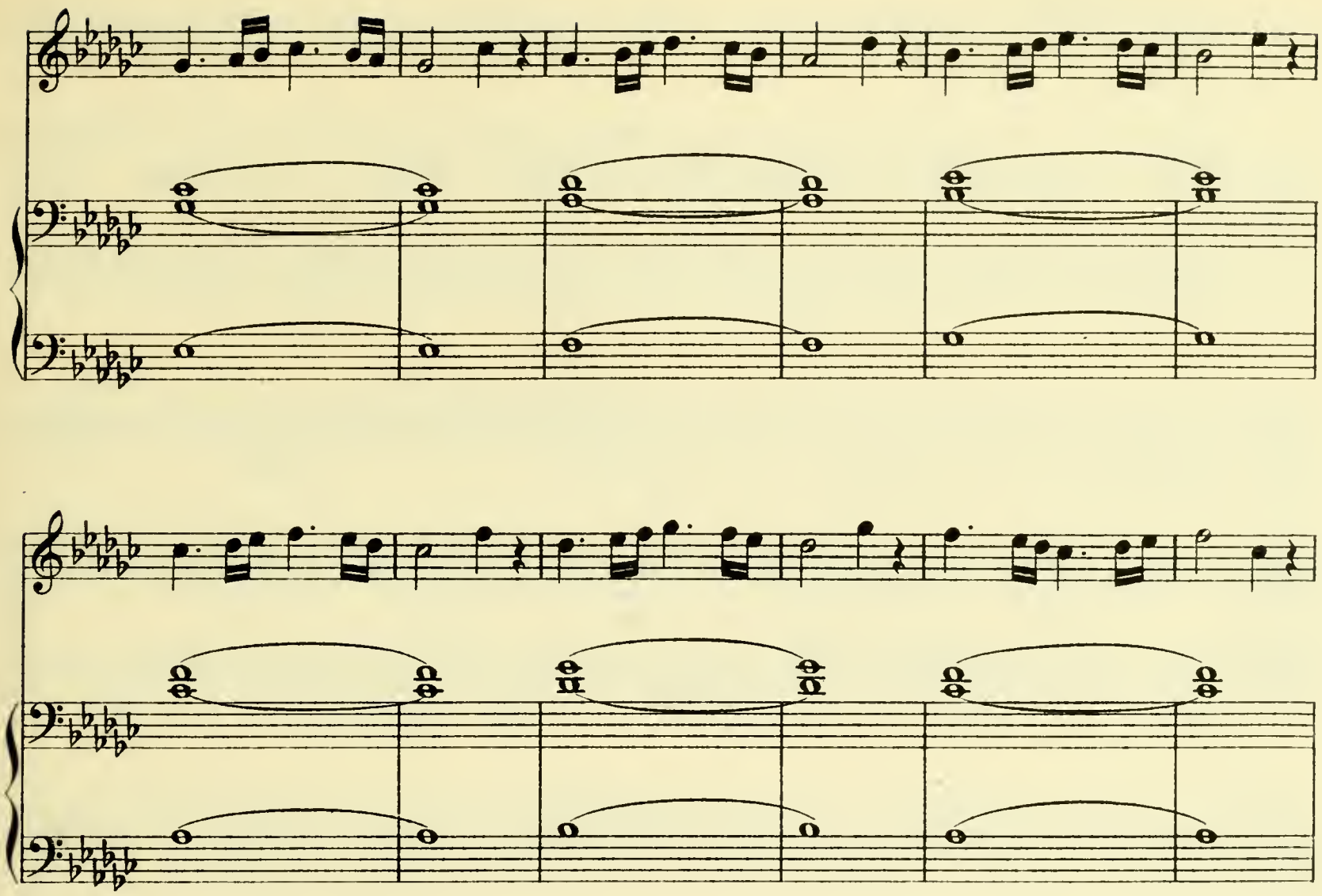


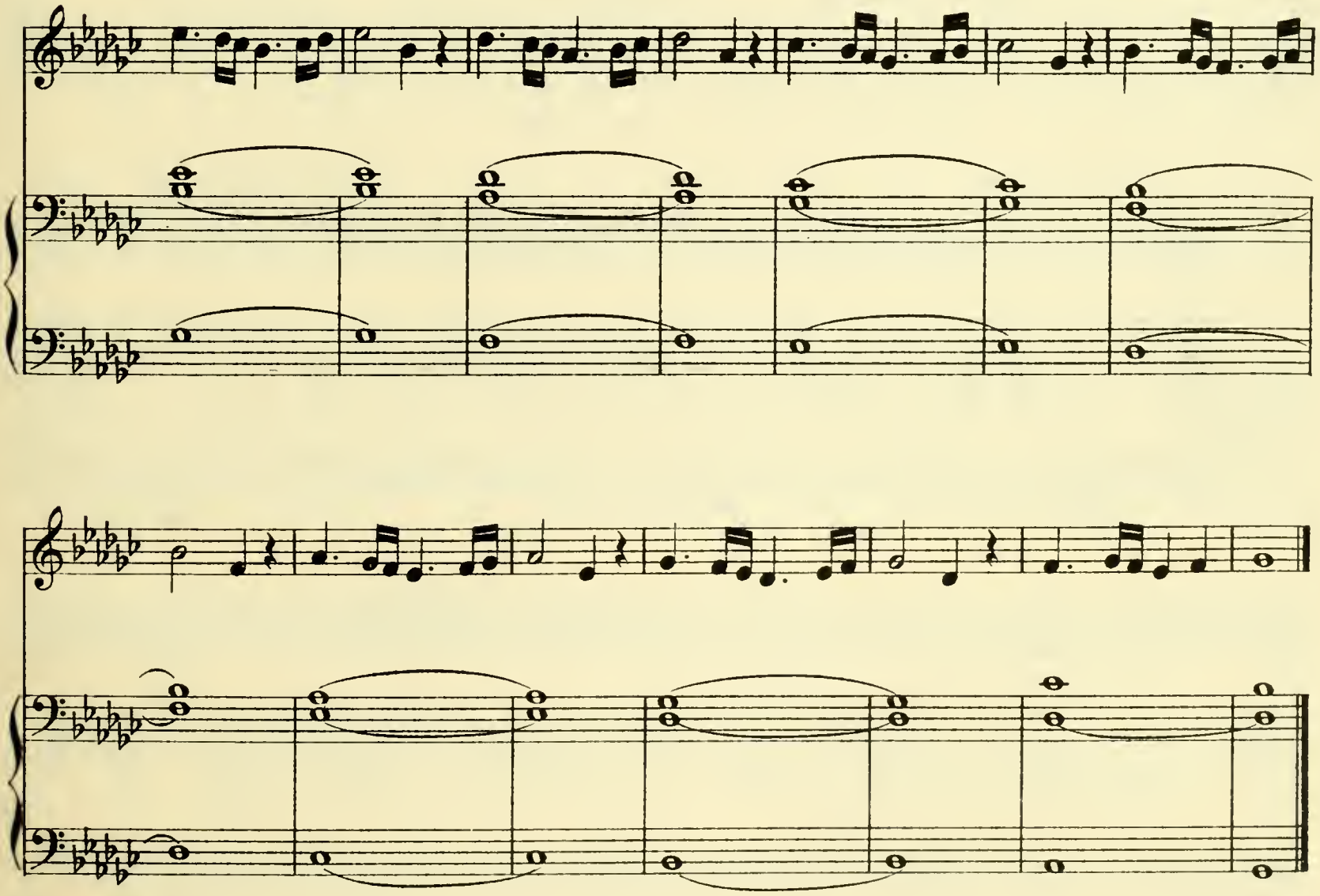


Andante.

31.
Gb.







Sostenuto.

32.
F.

Andantino.

33.
Em.

Moderato.

34.
F.

35.
D.

Moderato.

Moderato.

36.
Dm.

Sostenuto.

37.
B♭.

Andante.

38.
Gm.

Andante.

39.
Ab.

Moderato.

40.
C.

Andantino sostenuto.

41.
Ab.

Moderato.

42.
Db.

Andante.

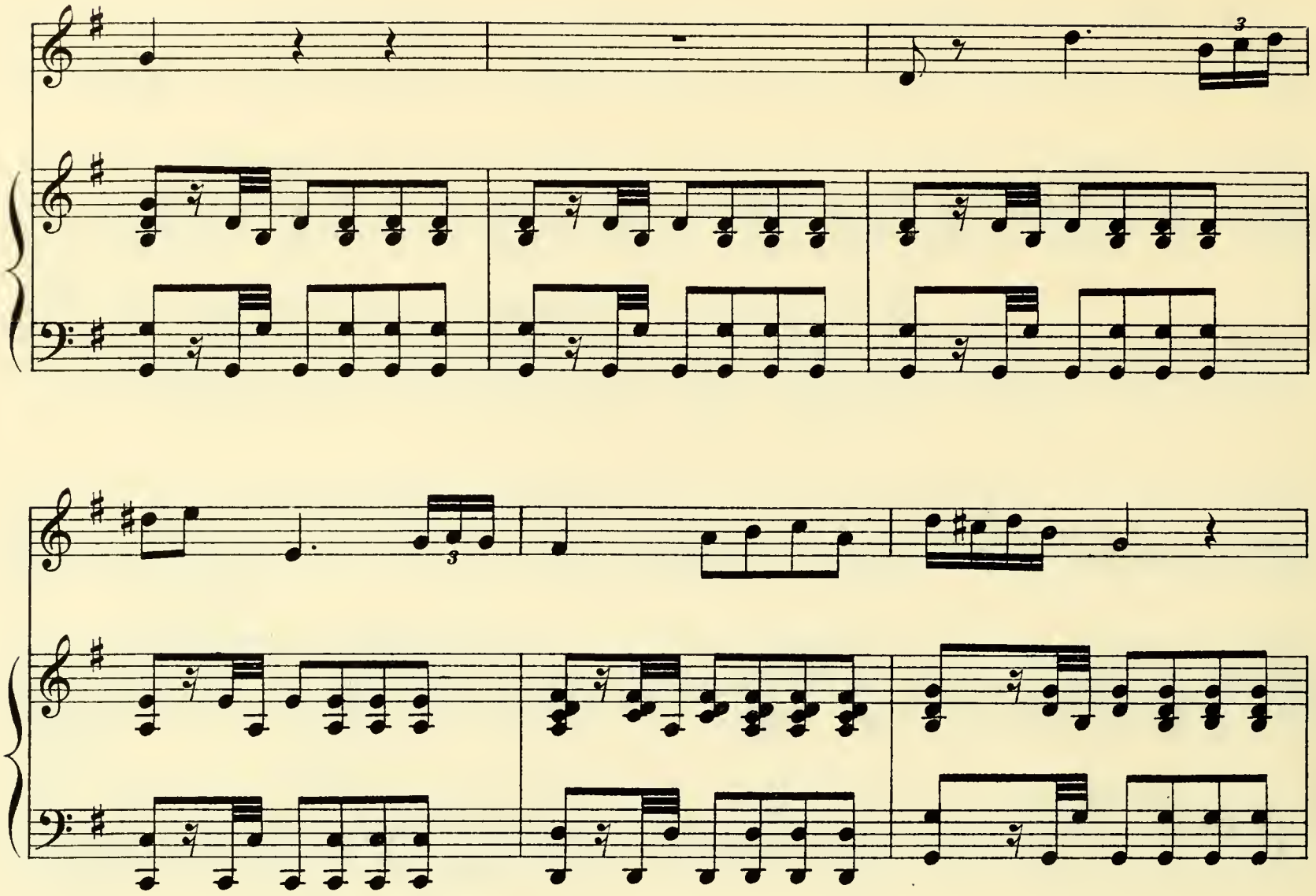
43.
B♭.

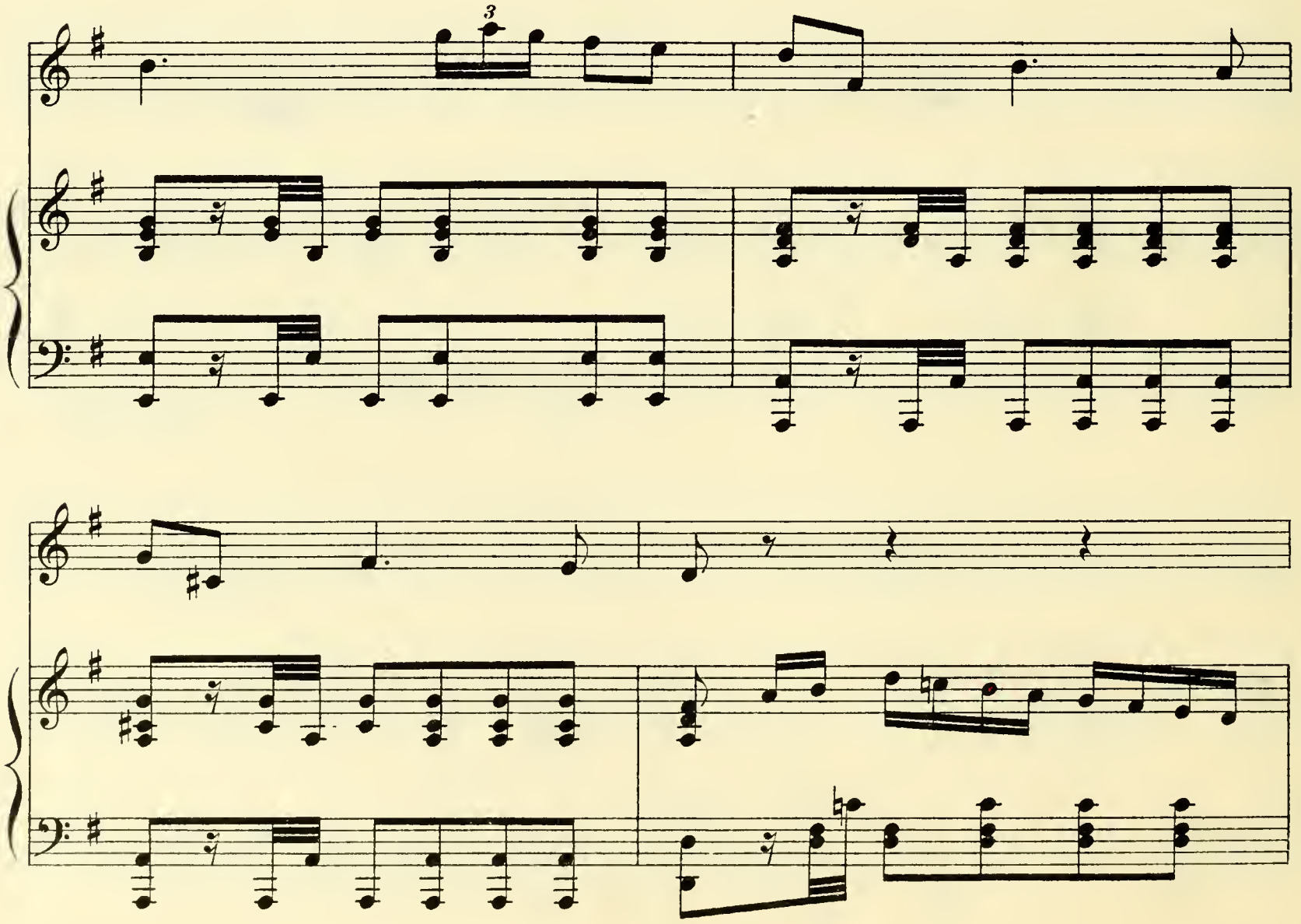
Andante.

44.
F.

Andante.

45.
G m.



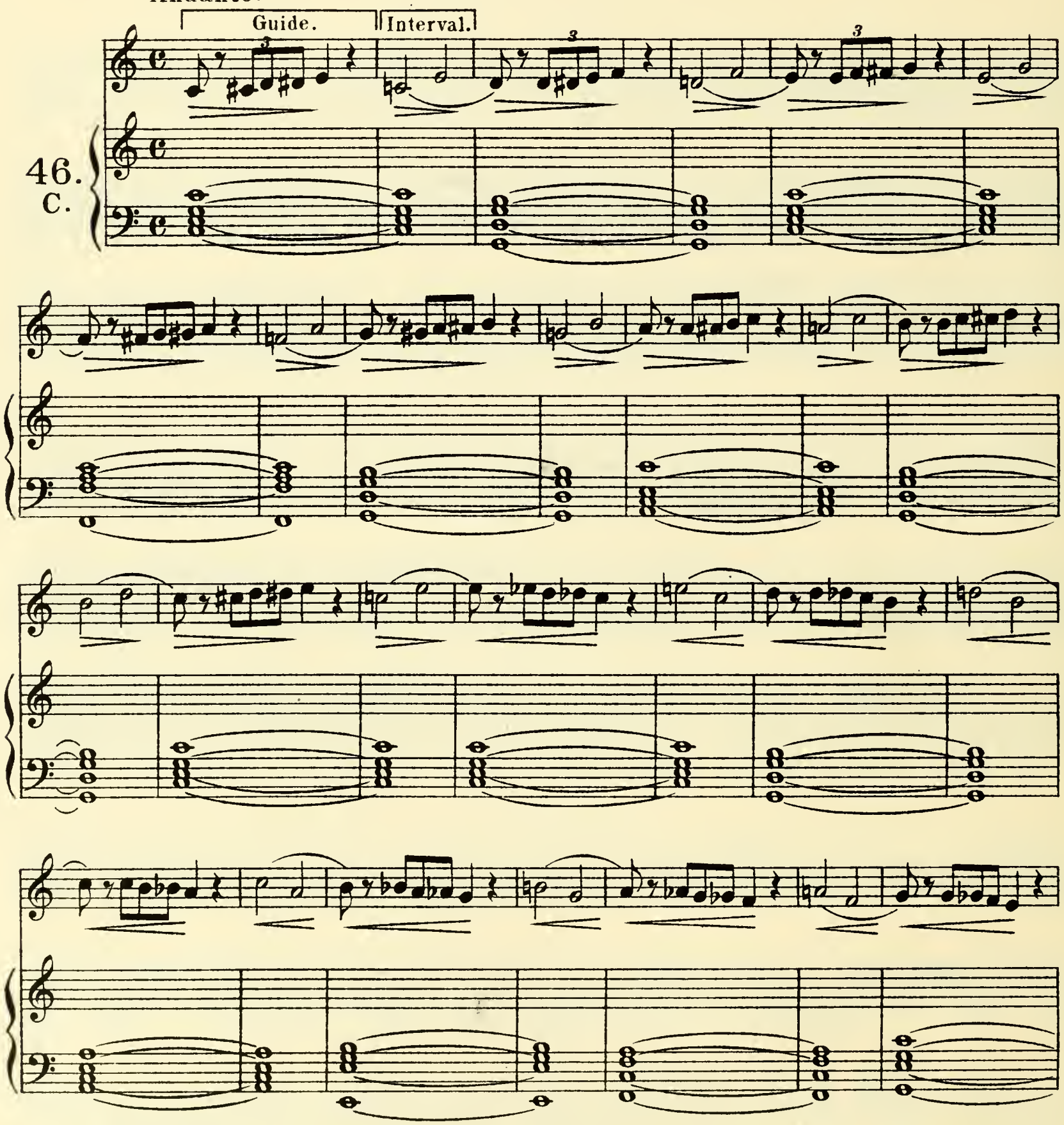


The Chromatic intervals.

The preceding studies have familiarized the pupil with the exact intonation of the *intervals* arranged in regular order and in conformity with the phonic conditions proper to each tone. To facilitate the application of this theory, we have till now proceeded in diatonic order. It now becomes necessary to learn the chromatic sucession of the same tones, for perfect familiarity with these closely approximate degrees of the scale serves to render intonation very exact. This was our object in presenting, in Lesson VII of *Vocal Art,* the study of *intervals* by chromatics. As this lesson includes one of the most essential parts in the didactic order of the studies of singing, the pupil may refer to it. We give a few preliminary exercises on the phonic conditions of the chromatic tones.

Intervals of Thirds.

Andante.



These intervals must be carefully practised with regard to the homogeneity of the different tones and their unity of timbre, as well as with regard to their intonation.

Allegro.

47.
C.

Andante.

48.
C.

Moderato.

49.
Ab.

rall.

rall.

a tempo.

a tempo.

p

p

cresc.

f

f

rall.

rall.

rall.

Tempo I.

rall.

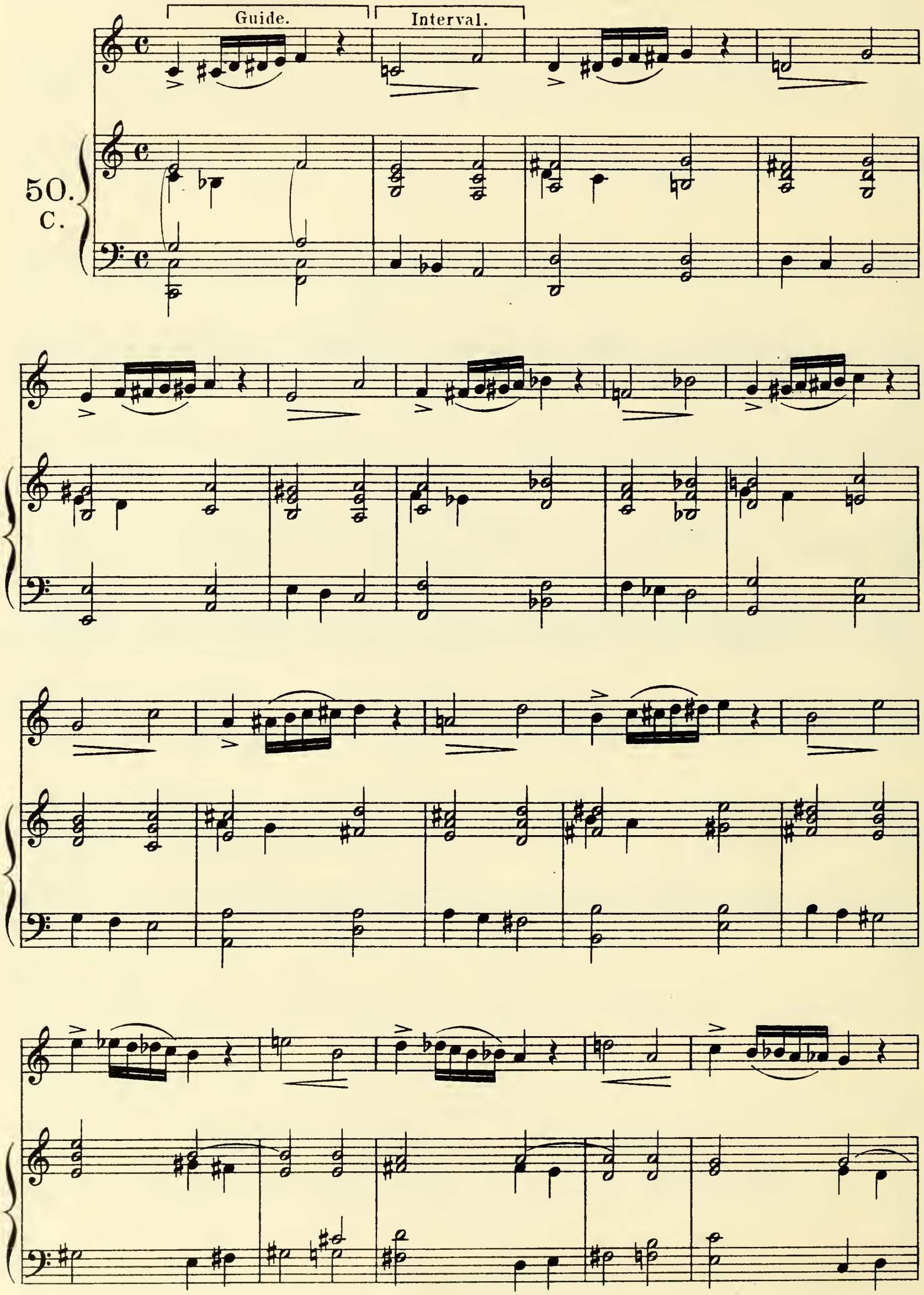
rall.

a tempo

a tempo

Intervals of Fourths.

Andante.



Andante.

51.
F.

Allegretto.

52.
F.

rall.

Intervals of Fifths.

Sostenuto.

53.
C.

Andante.

54.
C

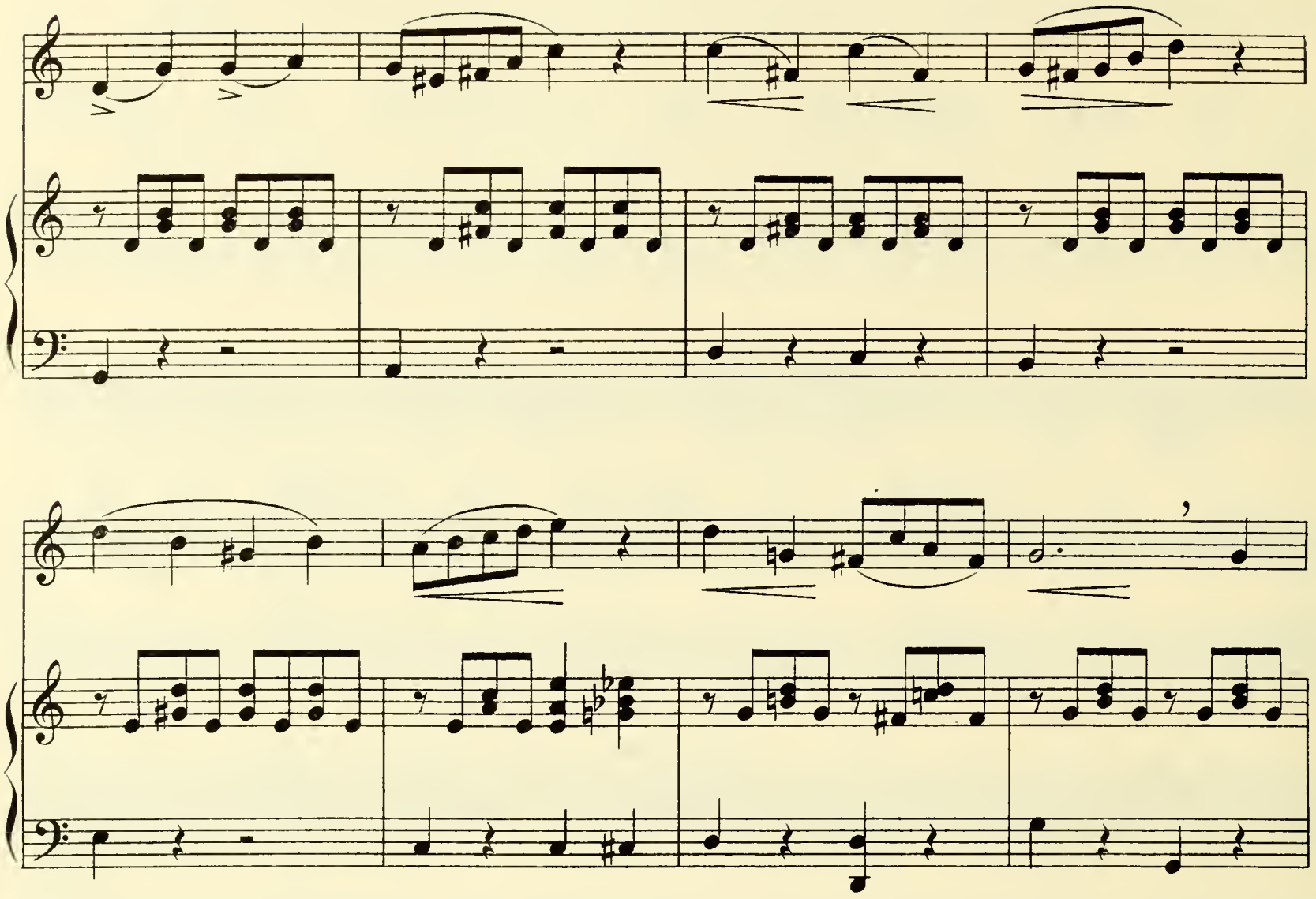
Moderato.

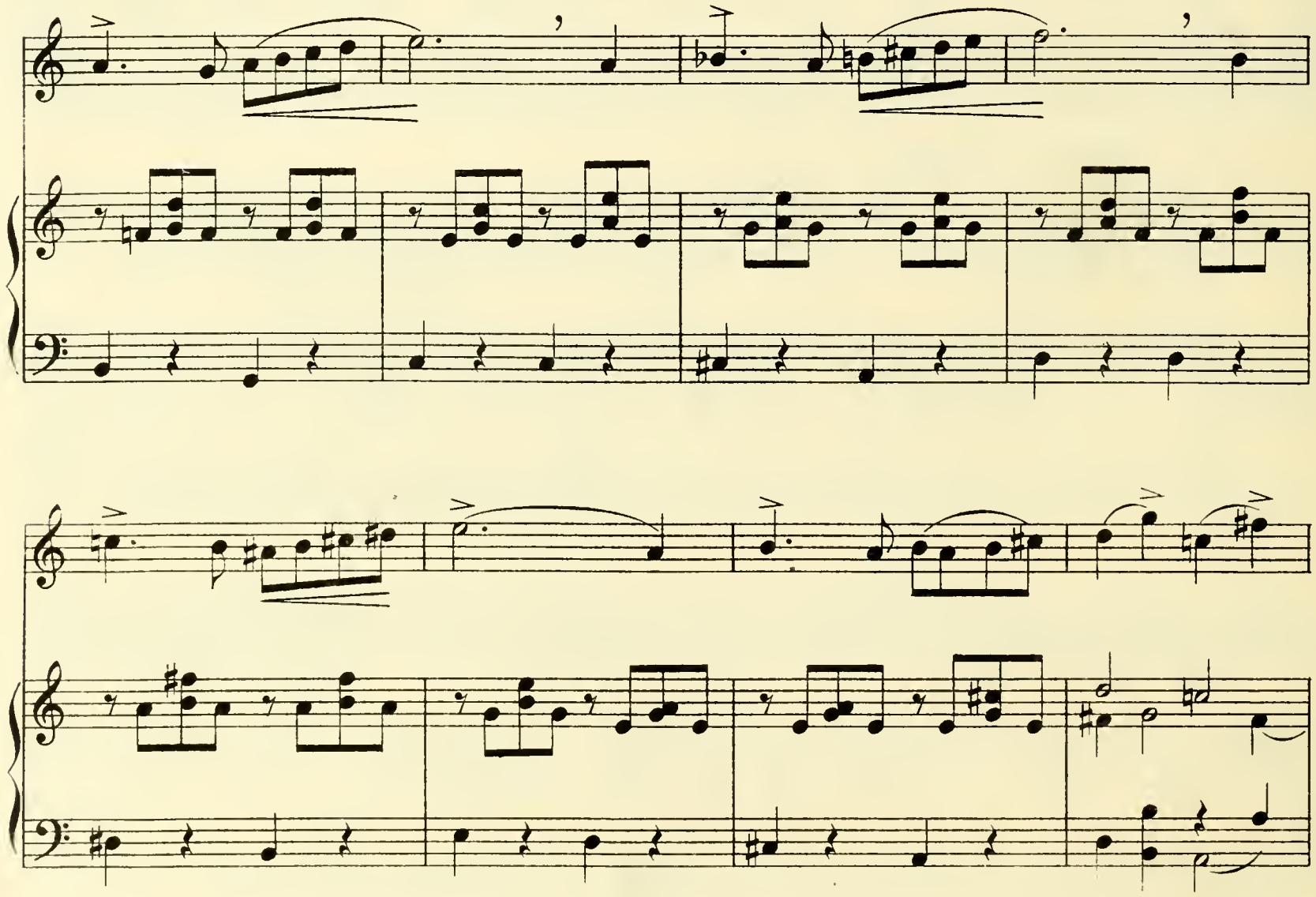
55.
C

Allegro moderato.

56.
C

Fine.





D. C. al Fine.

D. C. al Fine.

Intervals of Sixths.

Andante.

57.
C.

Allegretto.

58.
F.

Moderato.

59.
B♭.

rall.

a tempo

rall.

a tempo

Intervals of Sevenths.

Sostenuto.

60.
C.

Andante.

61.
F.

Andante.

62.
F.

Fine.

Fine.

rall.

rall.

rall.

rall.

D.C.dal 𝄋

D.C. dal 𝄋

Intervals of Octaves.

Moderato.

63.
C.

Andante.

64.
C.

Allegro.

65.
E.

rit.

rit.

a tempo

TENTH LESSON.

The Crescendo and Decrescendo.

After the foregoing lessons on the regular and phonetic order of the tones of the vocal scale, we shall take up the analytical study of the natural conditions of vocal expansion and elasticity.

It consists mainly of the gradations in the intensity of the tones, namely, the *forte, mezzo-forte* and *piano;* it also treats of the *crescendo* and *decrescendo,* these being the gradations by which we arrive at the inflections required by emotion.

But exaggeration of expression, and inexperience in art, may lead the pupil to produce the *crescendo* by increasing the pressure of air, or even by constraining the respiration. This violent manner of augmenting tonal intensity generally produces a harsh, shrill tone and even false intonation, in *fortissimo* effects. On returning to the *piano,* i.e., by a *decrescendo,* he runs the risk of interrupting the continuity of tone, or, should no break occur, he will find difficulty in restraining the vibrations of the tone itself, on account of the considerable constriction he must exert on the vocal tube.

This effort, opposed to the very nature of the vocal organs, would be highly prejudicial to the vocal tones, and prevent the production of the shades required for expression. We have shown the inconveniences of misunderstanding the causes which determine the acoustic effects of the *crescendo* and *decrescendo;* let us now examine these causes. We know that the commotion produced in the air by the (regular) vibration of an elastic, solid, or gaseous body, reaches our ear in the form of a tone; that the number of vibrations determines its pitch, while their amplitude, together with the causes that provoke concussion, determine its intensity. We have learned that the human voice acts by the aid of the air, which, forced from the lungs, passes the slit between the vocal cords; and that these latter, thus set in vibration, produce the vocal tone.

The voice is reinforced in the oral cavity and pharynx, they constituting the adjustable resonance-chamber of the vocal organ.

In Lesson V we spoke of the movements of the lips and tongue, of the soft palate, and of the pharynx, which modify the timbres of the voice, thus forming a number of different vowels; the production of these different timbres results from displacing the harmonics composing the vocal tone, and this phenomenon determines the resonance of the tone towards a higher or a lower note, according to the direction one wishes to give to its resonance (1). Thus the numerous vocal timbres are produced, which characterize the expression and produce the intermediate shades proper to the *piano, mezzo-forte,* and *forte,* which constitute in great part expressive singing.

The resonance of the vocal tone has the property of reinforcing one or another of the tones proper to the vocal cords; so that this *resonance* can assume a higher or lower pitch without at all affecting the pitch of the tone then in vibration.

Tyndall says that the promptness and accuracy with which the vocal cords can change their tension, their form and the distance which separates them, to which must be added the elective resonance of the cavity of the mouth, render the voice the most perfect of musical instruments.

The intensity of the air passing the glottis, to cause the vibration of the vocal tone, must correspond

---

(1) The nature of the vocal tone is complex; i.e., it is composed of various simple tones which vary in pitch, and, when added together, constitute the tone called *fundamental,* i.e., the lowest and loudest, from which the tone takes its name. This tone is accompanied by a series of others higher in pitch, which, when united, form the timbre. If we attentively listen to a thick violoncello-string set in vibration, we notice, besides the fundamental tone of the string, a series of tones higher and fainter. These are called *partial tones,* or *harmonics.* They include the octave above the fundamental, the 5th of the octave, the 2nd octave above, the major third of the second octave, etc., etc.

with the sum of the qualities mentioned by TYNDALL; otherwise the various degrees of fullness of the tone itself could not remain homogeneous, and both flexibility and intonation would suffer extremely.

This phenomenon can be explained by a simple experiment: Take a pitch-pipe with a reed, blow moderately into the mouth-piece, and the pipe at once gives the tone; continuing the tone, decrease the pressure of the breath, and the sound will decrease in intensity, producing the *decrescendo;* but, if at the same time you diminish the degrees of the intensity of the air, the tone becomes lower. If you increase them too much you will have the contrary effect; and if you still persist in increasing, the pitch-pipe ceases to sound.

This proves that when matter is set in motion, it is subject to some special economic laws from which it cannot depart.

The vocal cords are in nearly the same condition as the reed of the pitch-pipe, as regards the pressure and intensity of the air setting them in vibration; it is for this reason that the air expelled from the lungs vibrates in unison with that in the mouth. The vocal cords form, as it were, a reed which, associating its vibrations with those of the air in the mouth, produces in this sonorous tube the reinforcement of the vibrating tone.

In Lesson VI, speaking of the formation of the vowels, we learned that the air in the mouth vibrates in conformity with the several shapes given to the latter.

These adjustments of the oral cavity reinforce the fundamental tone or any harmonic. Thus it is that the human voice can produce, at the same time, the fundamental tone, and the harmonics in diverse proportions.

The *tone* is that quality of sound derived from its degree of gravity or acuteness; both depend on the number of vibrations made in a given time. The *intensity of the sound* (which we must not confound with the *tone*) depends above all on the *amplitude* of its vibrations and on the causes which determine the initial shock, and not on the *number* of vibrations. The progressive weakening of the intensity of the vocal sound does not imply a lowering of the tone; because, though their amplitude changes, the *number* of the vibrations does not, as long as the conditions of the shock remain the same; consequently *forte* and *piano* depend on the resonance or the displacement of the harmonics of the tone itself.

If we attentively observe the continuation of a vocal tone during a *decrescendo*, we soon perceive that with the decrease of its intensity (gradually varying the primitive type of the vowel) it approaches a vowel having a timbre more acute, without altering it too much; in a *crescendo* we notice the contrary effect. Our observations show that the *crescendo* is produced by the effect of the inferior resonance, and the *decrescendo* by the superior.

As the harmonic nearest the tonic (fundamental) is the higher octave, it is evident that a tone produced *piano* would cause the reinforcement of the harmonic of the higher octave, to the prejudice of the tonic. By going from the *piano* to the *forte*, the harmonics of the tone sung will be gathered around the tonic, and thus reinforce the lower octave.

According to this natural principle of the change in the harmonics, we may establish as a theory, that the *crescendo* transports as resonance to the lower octave, and that the *decrescendo* finds its resonance in the higher octave.

The continuous emission of the human voice depends on the regular and constant pressure of the air coming from the lungs; we must notice, then, that if the pressure of the breath against the vocal cords should diminish in intensity during a *decrescendo*, the tone would necessarily be lowered, since the cause of the shock would have changed. If we too greatly increase the intensity and pressure of air during the *crescendo*, the voice will rise higher than the original tone.

The displacement of the harmonics of the vocal sound must be made easier by the modifications of the vocal instrument formed by the pharynx, the oral cavity, and the lips. We have already remarked that when the voice passes from *forte* to *piano* or vice versa, it causes slight changes in the initial vowel, so as to reach either the superior or inferior resonance, according as the tone is sung *decrescendo* or *crescendo*. These changes are shown in the *comparative plate* in Lesson VI, concerning the phonic vowels corresponding to the tones of the vocal scale.

Now we have learned how to consider the vocal tone according to its phonic conditions; consequently we must regard each tone as formed by a special vowel.

We are acquainted with the vowels (Lesson VII) used for the formation of a considerable number of secondary vowels of a weaker timbre; we may explain this principle by comparing these vowels with the harmonics of a tone, as that of a bass string on the pianoforte of violoncello. In fact, during the vibrations of a thick violoncello-string, we hear, besides the fundamental, other attendant tones of weaker timbre and higher pitch, called *partial* or *harmonic* tones. Therefore, the intermediate vowels of a weaker timbre may be considered as harmonics of the vocal tone, since their phonic condition corresponds to tones higher than the initial one. Having ascertained that these slight shadings of the initial vowel result from the movements imparted to the organs of the mouth, we can systematize the practical study of the *crescendo* and *decrescendo* with the aid of the phonic vowels noted in the comparative table in Lesson VI, in so far as the succeeding exercises have conduced to a practical and regular application.

If *O* corresponds to the grave resonance, and *E* to the acute, the interval which the voice must run through to effect the *crescendo* and *decrescendo*, will be included between these two extreme limits.

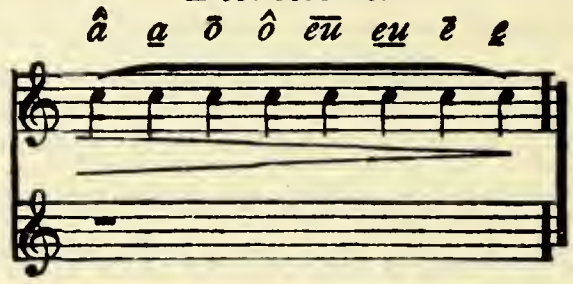
We must consider, however, that according to the comparative table (which we use as our guide) the high tones of the vocal scale require the production of an *E* as in the word *HER*, and that the grave tones, on the contrary, take an open *A* as in *FATHER*. Thus the two sonorous types of M. Koenig, *O* and *E*, undergo a slight modification by the singing voice; this is to be kept in mind in the following practical demonstration.

Our first demonstration is applied to the *decrescendo*, for the reason that, from the very nature of the vocal instrument, the tone-producing organs can relax more rapidly after the vigorous shock given by the *forte*; and this agrees with our observations in Lesson IV, concerning the movements peculiar to the vocal cords, according to the system elucidated by Dr. Fournié.

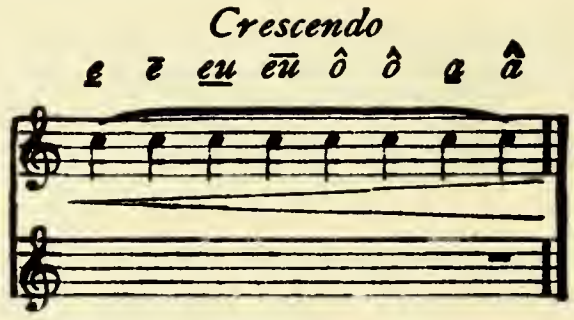
After what we have said on the displacement of the harmonics, the *forte*, uniting with the fundamental sound all its harmonics, engenders a tone of grave resonance corresponding to an *A*, inclining to open *O;* it may be approximatively compared to *A* grave in *WAS*. We start with this vowel to effect our demonstration, passing successively through the vowels whose regular gradation conforms to the lessening of the intensity and the sharpening of the resonance; we thus succeed in producing the *decrescendo* represented by *E* in *HER*. The tone adapted for our experiment will be represented by a note from the medium of the voice; its value will be that of a *breve;* and it serves to represent the initial vowel. On the upper staff will be written a number of crotchets corresponding to the duration of the *breve*, representing the timbres or vowels effecting the displacement of the harmonics which, in *forte,* are grouped around the *tonic*. Above the crotchets we place vowels answering to those in the comparative table.

Example:

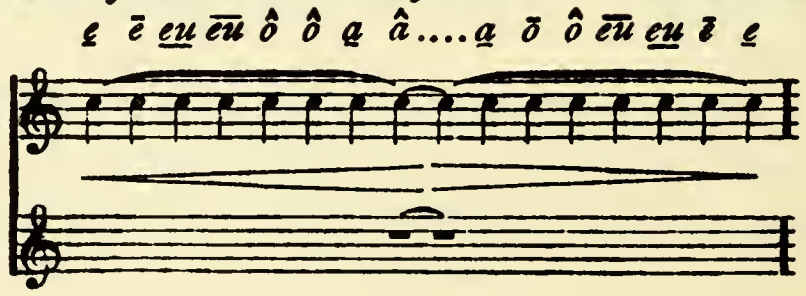
Decrescendo



Crescendo



Suono filato *Son filé* *Swell-tone*



During this experiment the pupil must sustain the tone by a retarded motion of the expiration, so as to avoid a sudden escape of the air, keeping the thorax raised in its natural position and without effort; for its lowering would let the air escape uncontrolled;

consequently, the swell-tone would lose in tension and firmness. Notice that the vowels placed above the notes have served to render our demonstration clearer; but they must be considered only as a typical guide intended to lead to the minute modifications necessary for the production of this acoustic effect of the vocal tone, without prejudice to the initial vowel characterizing the timbre set in vibration.

Let us now proceed to the *decrescendo.*

We remember the exercise in Lesson IV, for attacking the tone; in the same way we must proceed to set the voice in vibration in the *forte* of each tone in the following scale, and give to each the *decrescendo.*

To prevent the pupil, preoccupied by the endeavor to obtain this acoustic effect, from falling into the very probable error of neglecting the phonic conditions of each single tone, we write over the notes the vowels corresponding to their phonic condition according to the aforesaid comparative table.

While studying the *decrescendo* we shall abstain from indicating the intermediate vowels which served for explaining the phenomenon under consideration; for here the pupil must follow the transformation of the vowel by degrees conforming to the vibrations of the bass string of the pianoforte, and adapted to the peculiarities of each voice. In order to help him to reach this result, we have combined the accompaniment with each note in the scale, so that his ear may more readily follow the effect of the decreasing vibrations of the tonic and the displacement of its harmonics, up to the resonance of its higher octave. By this means, this acoustic effect may easily lead the voice to produce the *decrescendo;* provided the pupil endeavors to make it follow the effect produced by the piano-string. This study must be executed *slowly,* in order to give the ear time to perceive this phenomenon, and the voice time to imitate it.

When the pupil can correctly execute the first scale (1), he may proceed to its higher transposition, by chromatic progression, in order to render the changes of pitch as homogeneous as possible with the first scale, by careful attention to the phonic changes which it undergoes.

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(1) The word *scale* refers only to the progression by conjunct degrees of the exercises in question, composed for the purpose of studying each tone separately.

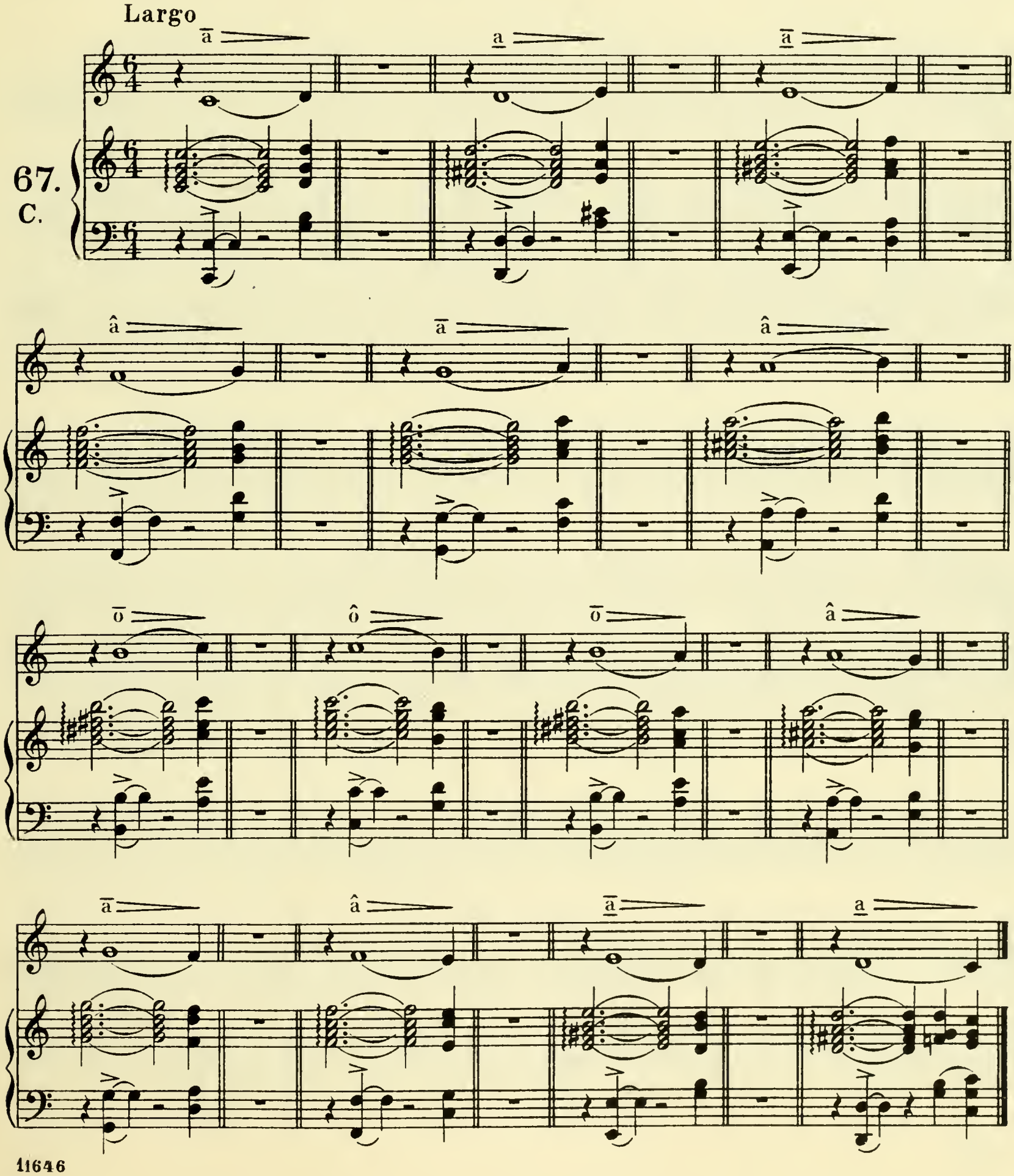
Largo.

66.
C.

When a vocal tone is to be united to another with a *decrescendo,* we must first endeavor to obtain the resonance of the higher octave on the first tone before passing to the second, which, consequently, must produce a weaker timbre.

In the following exercise the *decrescendo* will be produced on the interval of a *second,* as: C-D.

By the preceding exercise, we showed that the *decrescendo* on one tone, draws the latter into a *pianissimo,* corresponding in resonance to its higher octave, while preserving the initial pitch; it is clear, then, that the second tone, on which the *decrescendo* in the following exercise stops, can be composed of higher harmonics only, that is, it can be made sensible to the ear only when transported to the resonance of the higher octave. This phenomenon forms, to a certain extent, an analogous effect to the substitution of the interval of the *ninth* for the *second,* that of the *tenth* for the *third,* and so on.



Largo.

68.
C.

Largo.

69.
C.

The crescendo.

To obtain the effect of the *crescendo*, we must proceed in the contrary sense to that of the *decrescendo*; in other words; by attacking the tone *pianissimo* and swelling gradually to *forte*.

Thus it is by the resonance of the higher octave, producing the weak tone, that one should attack the tone, then, by enlarging the vowel, one will approach insensibly, by very minute degrees, to *A* grave, as in WAS.

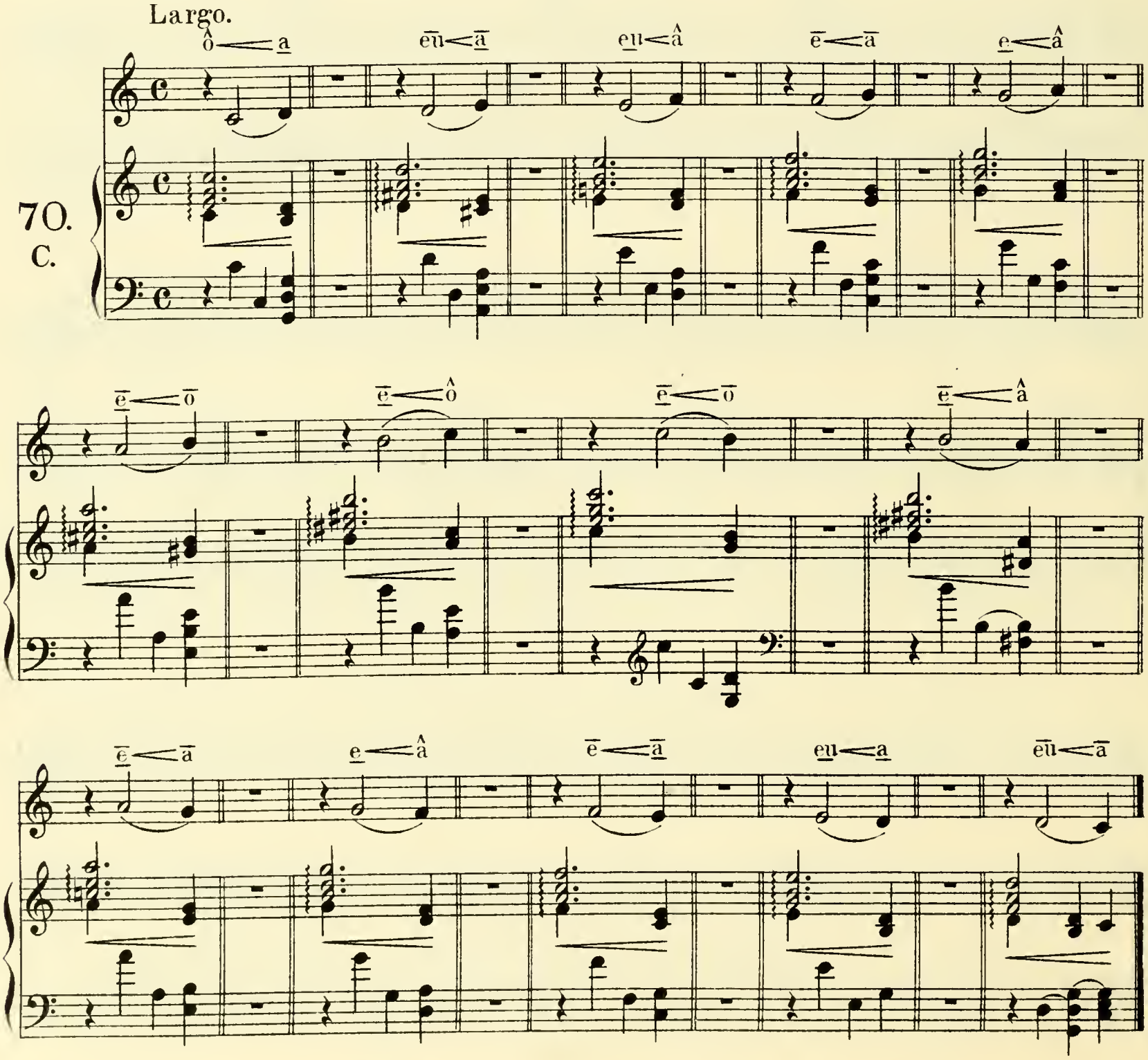
The pressure of the air against the vocal cords must increase naturally and without effort, parallel with the descent of the resonance.

We must not exaggerate this action, for it may happen that a strong pressure of air obscures the voice, while forcing the involuntary escape of the atmospheric air in the mouth.

To facilitate a comprehension of the transformation of the vowel in this exercise, the application of which is much more difficult, we shall place above the first note the vowel corresponding to the high resonance while on the second will be seen the true vowel proper to the special pitch of the same tone.

To show the acute resonance of the notes A, B, C, D, etc., the vowel will be invariably marked thus: $\bar{e}$, but the pupil must always endeavor to close it more and more as the resonance rises toward the acute, by an *E* mute as in Bird.

The exercises follow.



Largo.

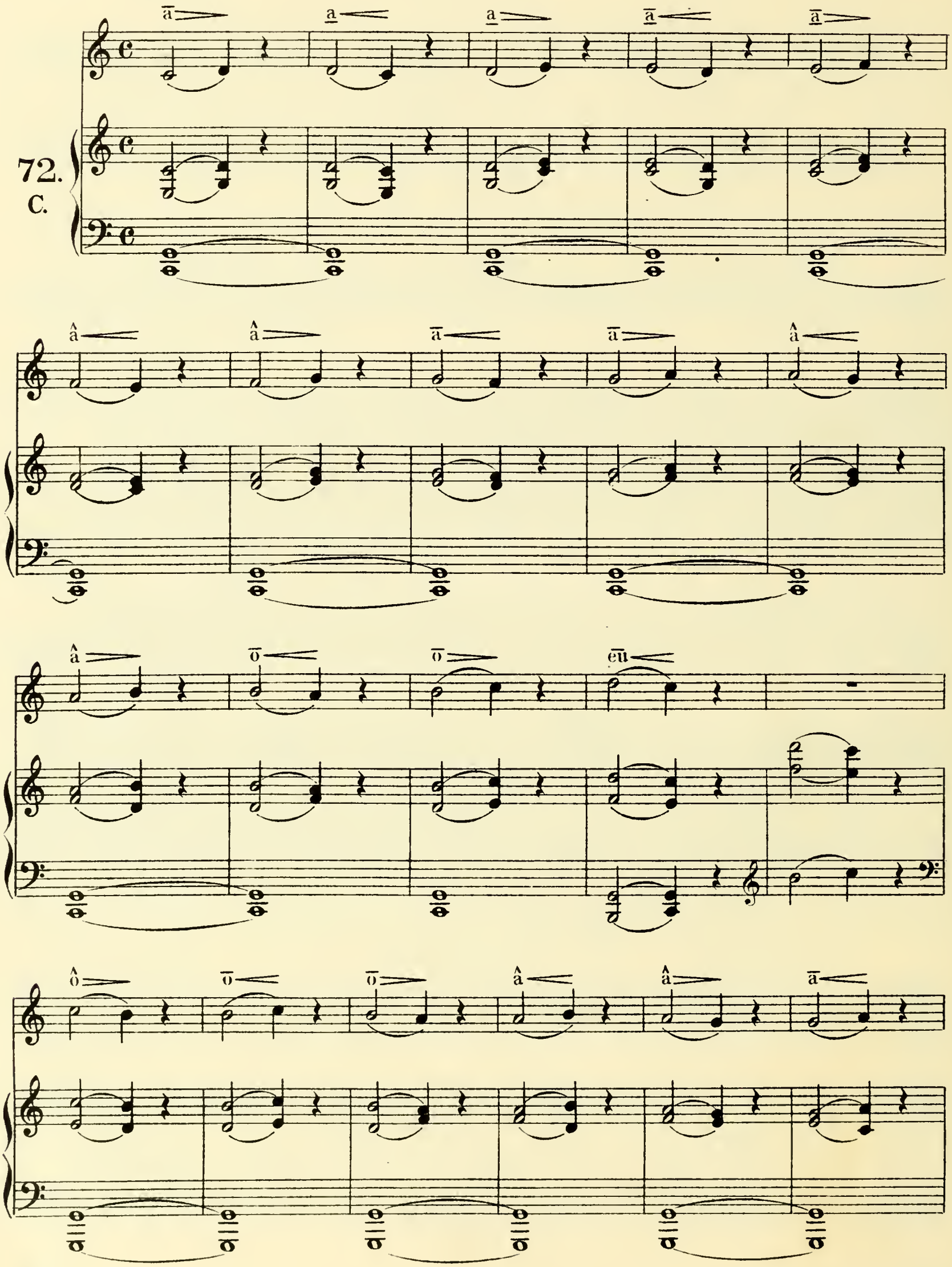
71.
C.

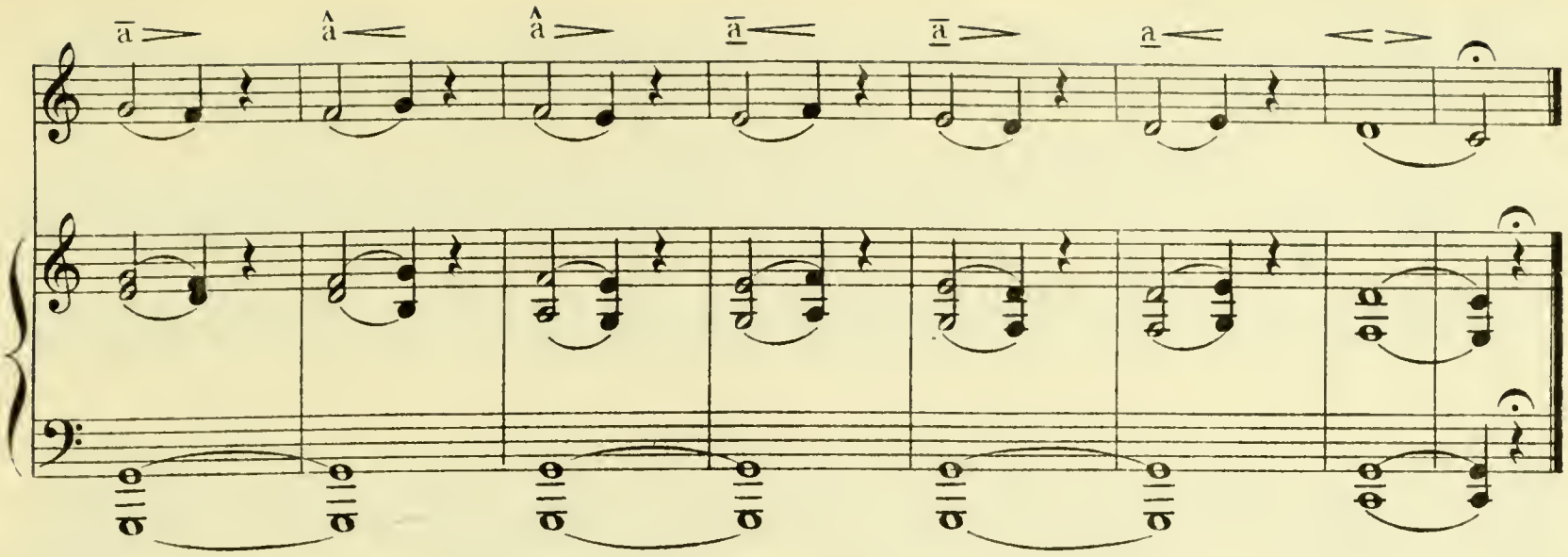
After careful practice of the preceding studies on the *decrescendo* and *crescendo*, we shall take up the study of the alternative application of the effects of resonance.

The following exercises must be successively transposed in pitch.

Andante.

72.
C.

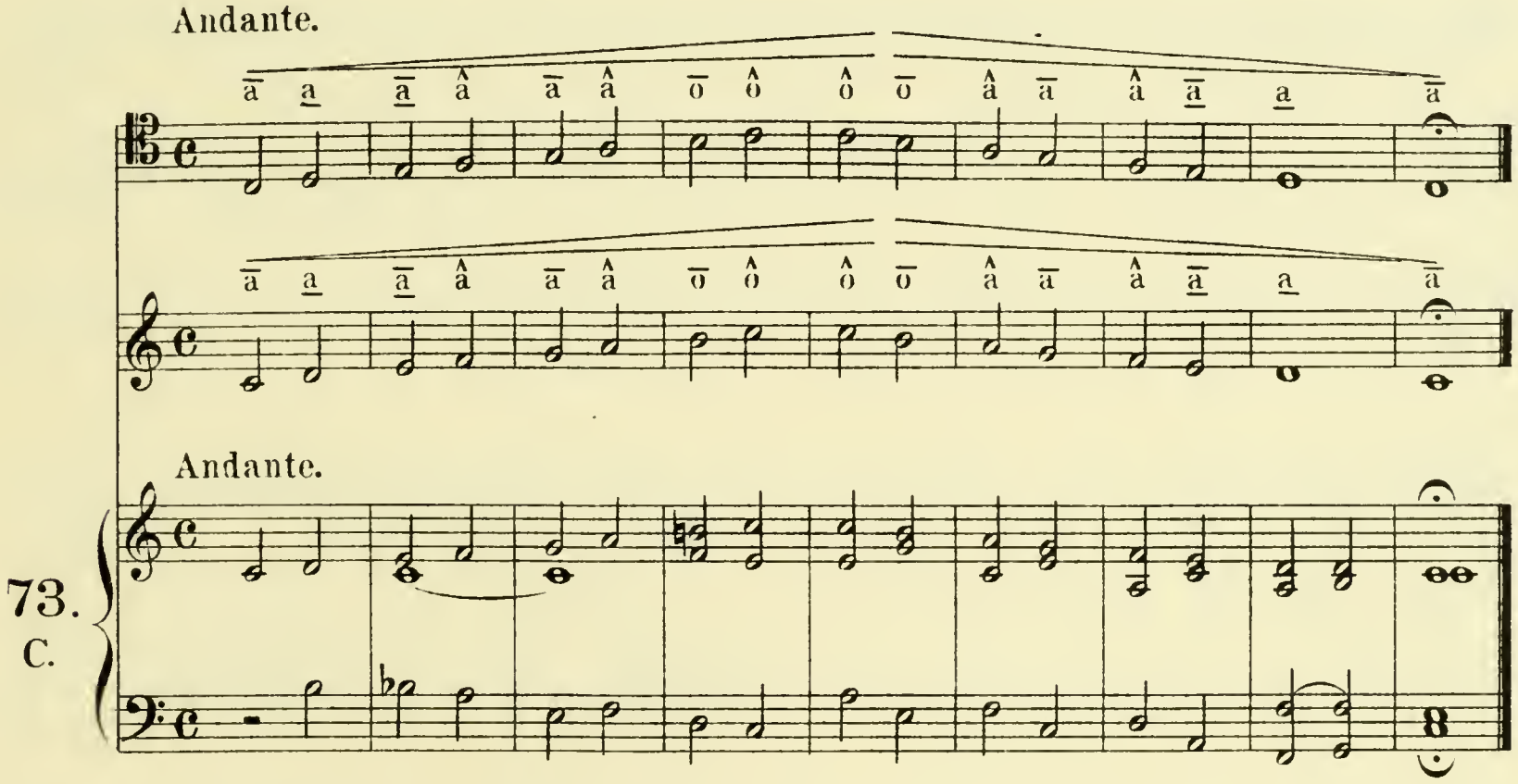




The result of the preceding exercises will allow us to apply the effects of the *crescendo* and *decrescendo* to a series of consecutive tones. In the following scale these effects are applied.

The pupil ought to practise it in several successive keys; and in attacking the first tone he must give the voice the resonance of the higher octave; the notes that follow will descend in resonance to the lower octave by gradations equal to those of the ascending notes: a contrary effect will be produced by the descending movement.

73. C.

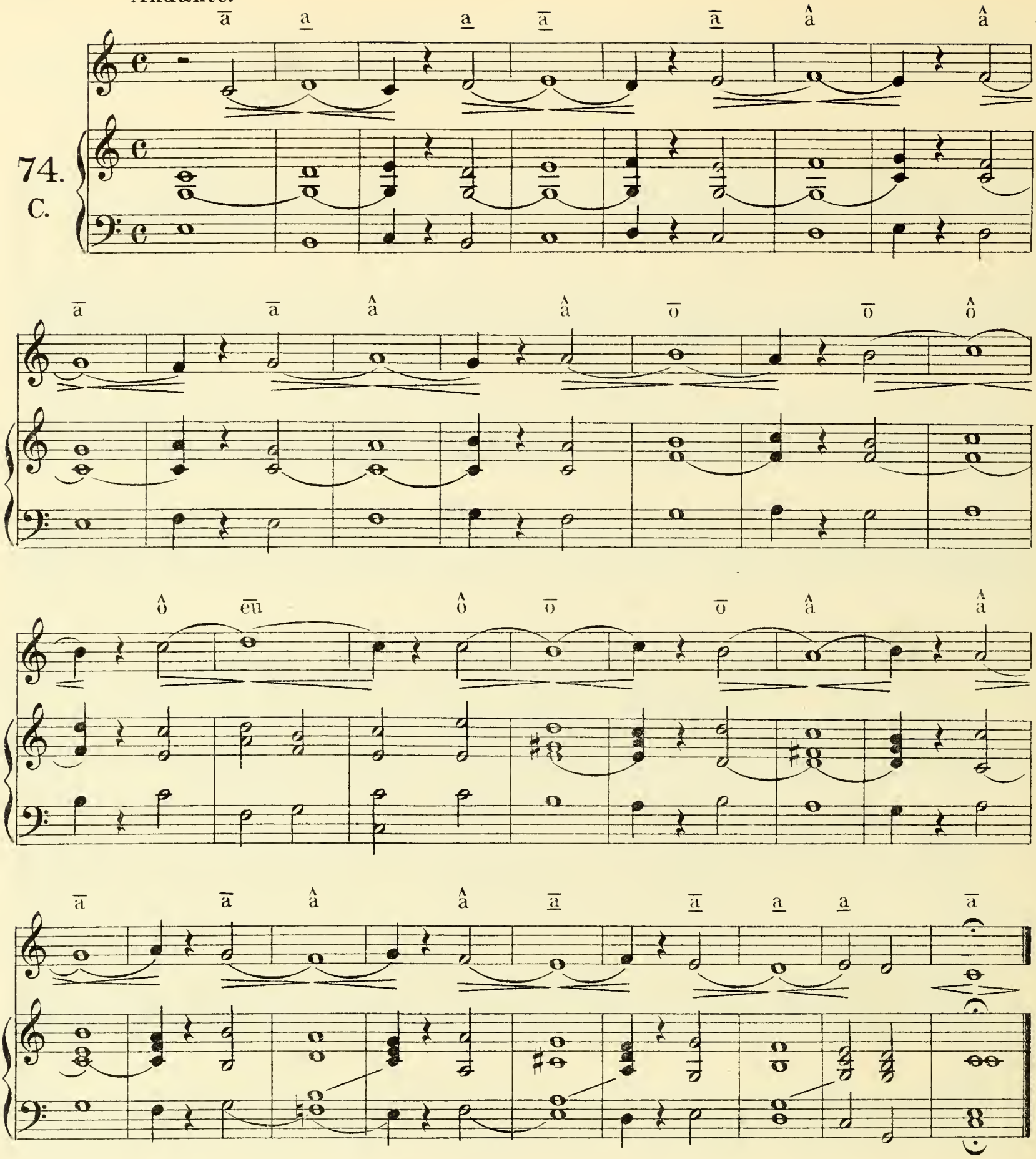


The effect of swell-tones is prepared and obtained by the exercises given below. As the studies practised hitherto have sufficiently prepared the voice for natural and easy expansion, there is no need of too strong a pressure of air. The notes must be bound to each other without *dragging*. By the resonance of the higher or lower octave, as the case may be, the desired result will be attained, as before.

Thus, in *decrescendo*, one tone will be bound to another while passing from *forte* to *piano*, and in *crescendo* the contrary effect will be observed. When *mezzo forte* is reached the passage to the note to be bound ought to be effected lightly and steadily.

Andante.

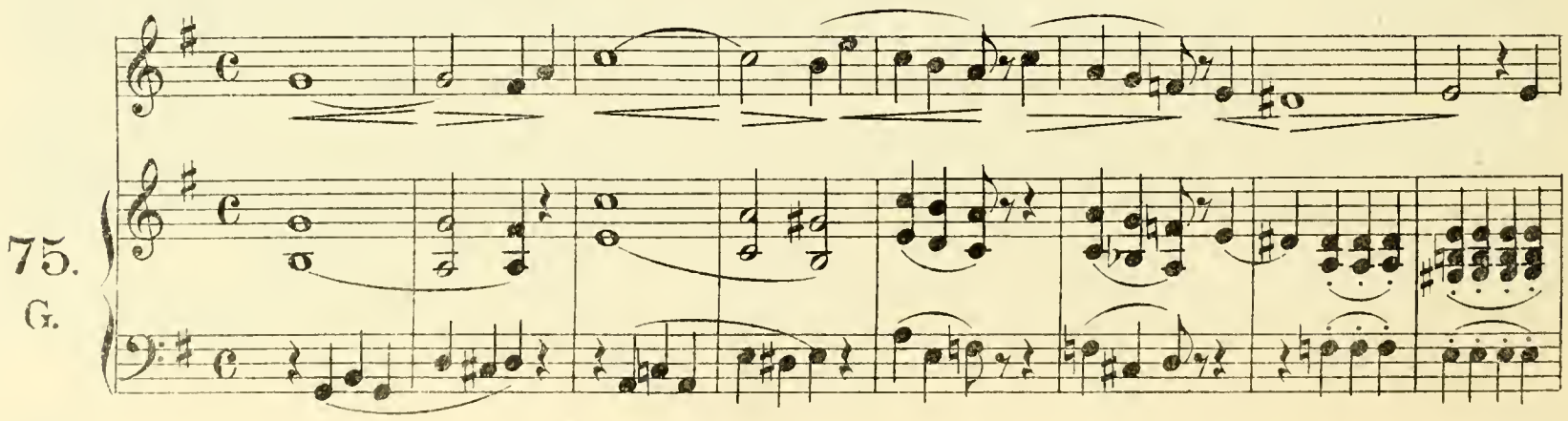
74.
C.



The exercises on *swell-tones*, as applied to simple and compound intervals now follow.

Andante sostenuto.

75.
G.



Andante.

76.
F m.

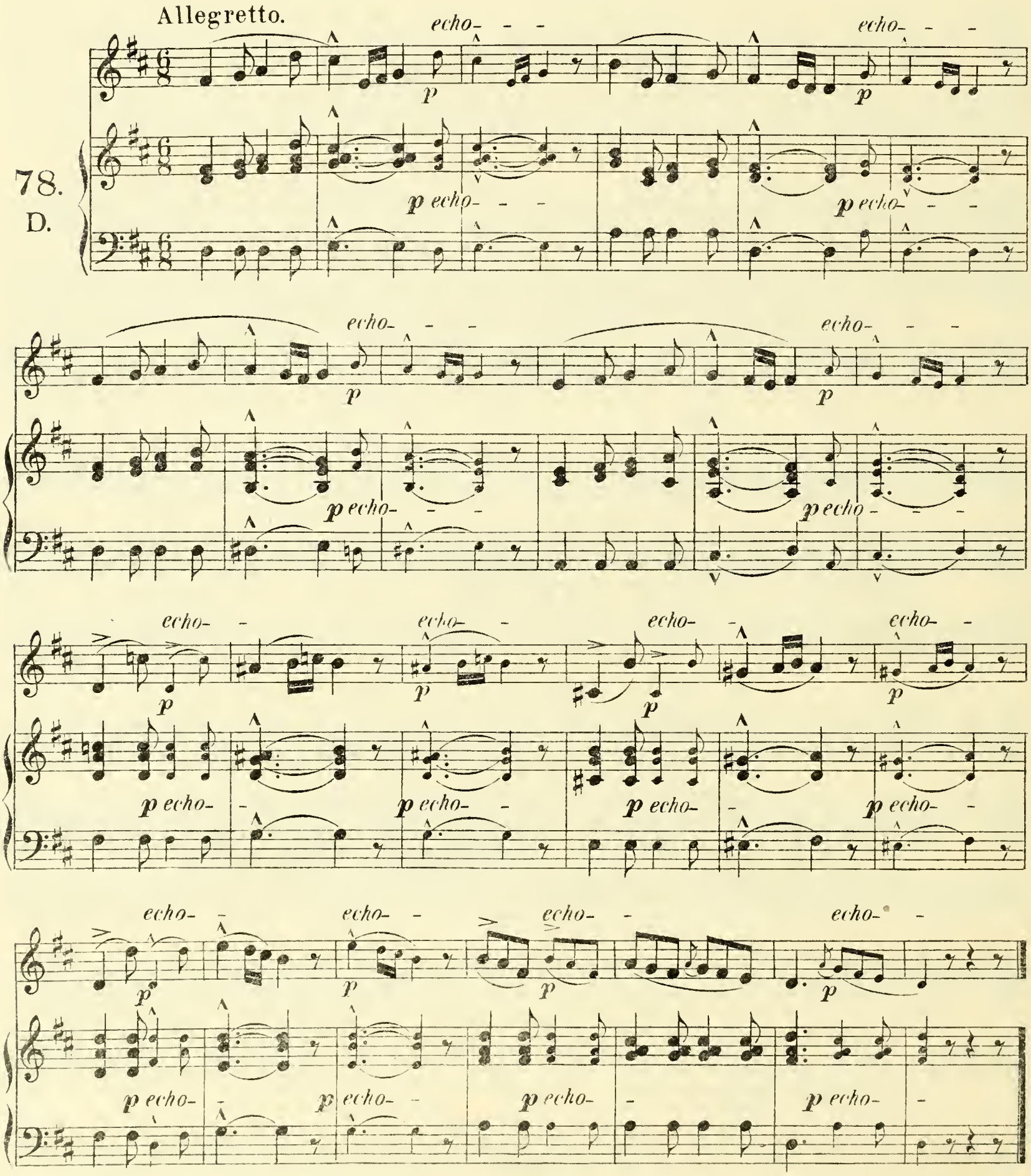
Moderato.

77.
Ab.

The Echo.

There are two kinds of echoes, the echo produced immediately and the echo produced after a pause of greater or less duration. The first is obtained by means of an immediate *decrescendo* on the last tone of the musical phrase and by blending this *decrescendo* with the first note of the echo, carrying the voice from a grave to an acute timbre. In the second instance the last tone of the musical phrase must be given with all its natural brilliancy, and then, after a pause, the echo must be produced with the voice full, but sombre, in tone.

To obtain the effect of the echo it is necessary to give the voice a close, almost veiled, timbre, restraining the breath slightly and at the same time opening the throat well; the tone (phrase) must be given with an open vowel, and the echo with a closed one.



SECOND PART.

FIRST LESSON.

On Agility.

Agility is an essential requisite for singers, as much for the flexibility and mellifluousness of the voice, as for the brilliancy needed in florid singing. By means of the flexibility of the vocal organ, the diligent student will finally be able to give his voice all the inflections necessary for representing the passions logically and naturally, and, to *passages of agility*, the color proper to the sentiment.

By *passage of agility* is meant the rapid, distinct, and rhythmical vocal execution of several notes on one syllable.

Agility demands a natural disposition analogous to that for the trill; nevertheless, by constant and well-directed study, the deficiencies of nature may be remedied. The human voice, like instruments, must be conspicuous for its sonority, homogeneity and purity of timbre; the syllables on which passages of agility are placed are always long, and the voice, while preserving its brilliancy and purity, must intone clearly, and in a correct and facile manner, all the notes; and this without effort, either real or apparent, otherwise agility will become a cause of suffering, instead of a pleasure, to the ear of the auditor. Effort is often caused by the respiration when not regulated according to the principles we have explained.

The most favorable vowels for singing are *A*, *E*, *Ó* and their relative intermediaries, they being best adapted for giving fullness and intensity to tones. *U* is not favorable to just and even intonation, and *I* even less so, as it gives the voice a sharp and whining timbre.

It is a mistake to think that agility is out of place in melancholy or passionate singing; for we often express a sad or sentimental thought better by a slow or rapid succession of inarticulate sounds than by words.

We have just said that agility may be executed with a slow as well as with a rapid movement, according to the idea which dominates the mind. A melancholy idea originates in despair, fear, pain, or resentment, and the passages of agility pertaining to these will necessarily be rapid; but to express *abandon*, tenderness, sadness, or the remembrance of a happy past, agility must be slow and sustained: with these two contrary movements we must associate the inflections which give them the best and most natural expression and color, and this is why flexibility and mellifluousness are indispensable to the voice for rendering and executing passages of agility.

The movement and rhythm of agility must, moreover, reflect the idea with which it is associated, and this with the object of giving (by means of the *Rallentando* and *Affrettando*, applied almost simultaneously to the same phrase) that descriptive or imitative color which is necessary for reproducing the expression of the thought.

It is also a great error to believe that *passages of agility* are always well-placed on any syllable or word whatever, without considering whether the melodic situation, the sentiment, or the style, permit: they must always be *apropos*.

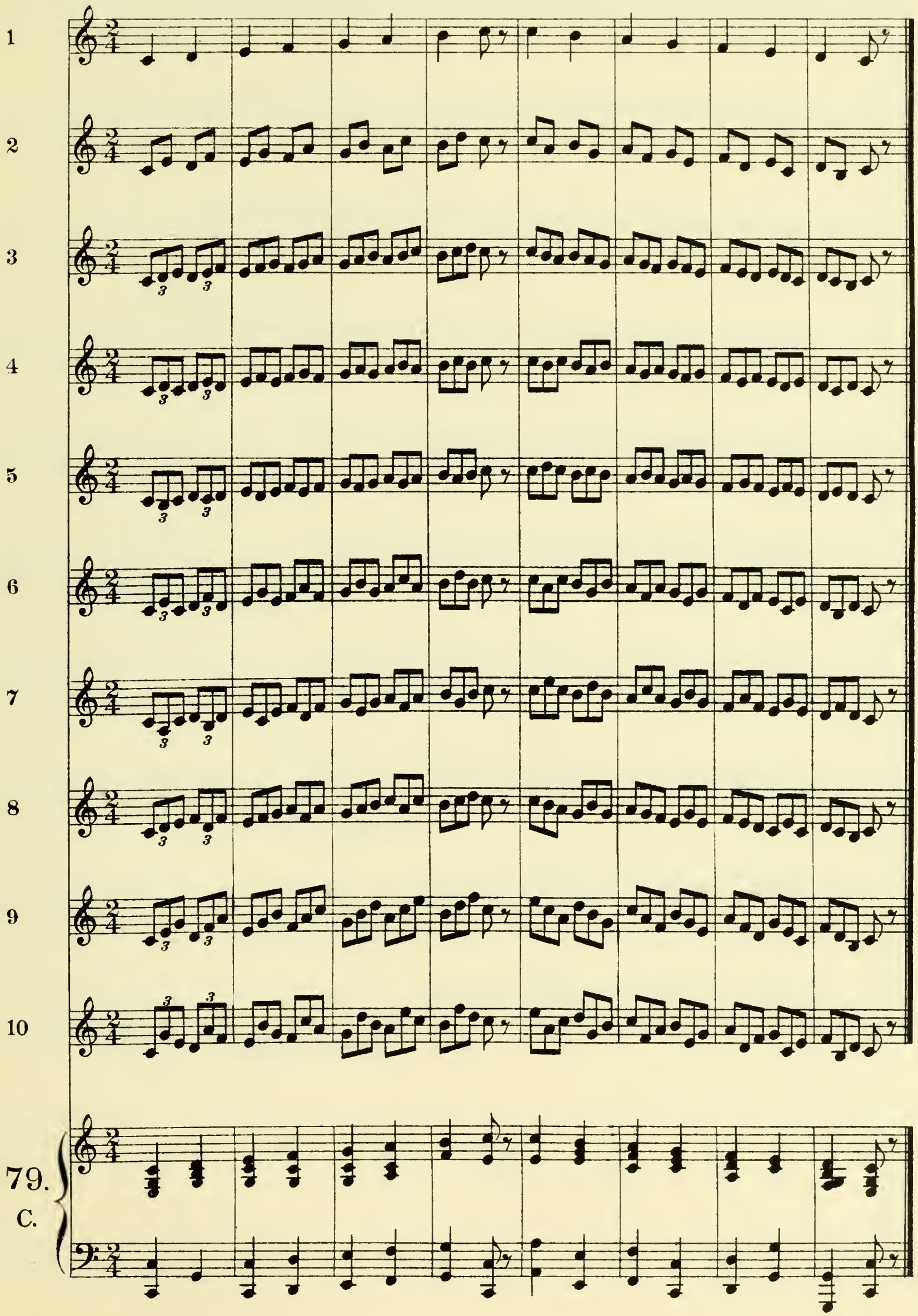
The first condition for success in this study is to know how to regulate and control the respiration. We must be careful not to fatigue it with too long passages, when it is not yet well established. In agility, as in sustained singing, one must not reduce himself to the last extremity of the breath; as, besides the fatigue imposed upon the breathing-apparatus, the effect of the singing would be compromised: thus, if in the course of studies and exercises for acquiring agility of the throat and voice, we should come across passages too long to allow the expiration

to reach the end without effort, it will be well to divide them into two or more parts, being careful to stop at the end of each, and beginning the succeeding part on the same note we left off at, until the respiration has acquired the necessary facility to execute them without interruption.

We must observe an irreproachable precision of the intervals, and here we shall point out more especially intervals of seconds, which always tend to lower the pitch ; also that of the major third, the first note of which has a natural tendency to rise above the pitch, and the third note to descend. In the ascending scales, besides the intervals of seconds, we must sustain the leading-tone, which is apt to be attracted by the tonic, and may often become inappreciable because of its precipitancy.

In scales of octaves we must also accent the ***subdominant***, and in scales of ninths the *dominant.* All exercises must be practised both ways, and, whether the passages be slow or rapid, they must always be regularly rhythmed and the movement must not be precipitated, as a too rapid emission of successive tones would produce confusion or indistinguishable noise, in which only the first and last notes of the passage executed would be audible, rather than a musical effect.

assages of agility must preserve the same time as the *ensemble* of the piece, except when the expression indicates otherwise. We must work slowly at first, accenting all the notes according to the given rules, and gradually increasing the movement as we acquire facility. All the notes of an exercise or pas sage must preserve the same nature, the same degree of force and accent, and the same intensity. We must not go on to the study of inflections and shades, until the mechanism of the throat and the flexibility of the voice are sure. As the vocal cords vibrate the notes of a musical passage, one must see that they are well connected, in order to avoid any escape of air between them, which would produce a disagreeable jerky effect; some throats have great difficulty in doing this, and their execution is shaky, heavy or uncertain; in this case all the notes must be marked, and if this is not enough, the *picchettato* sounds must be practised until the throat has acquired the necessary flexibility.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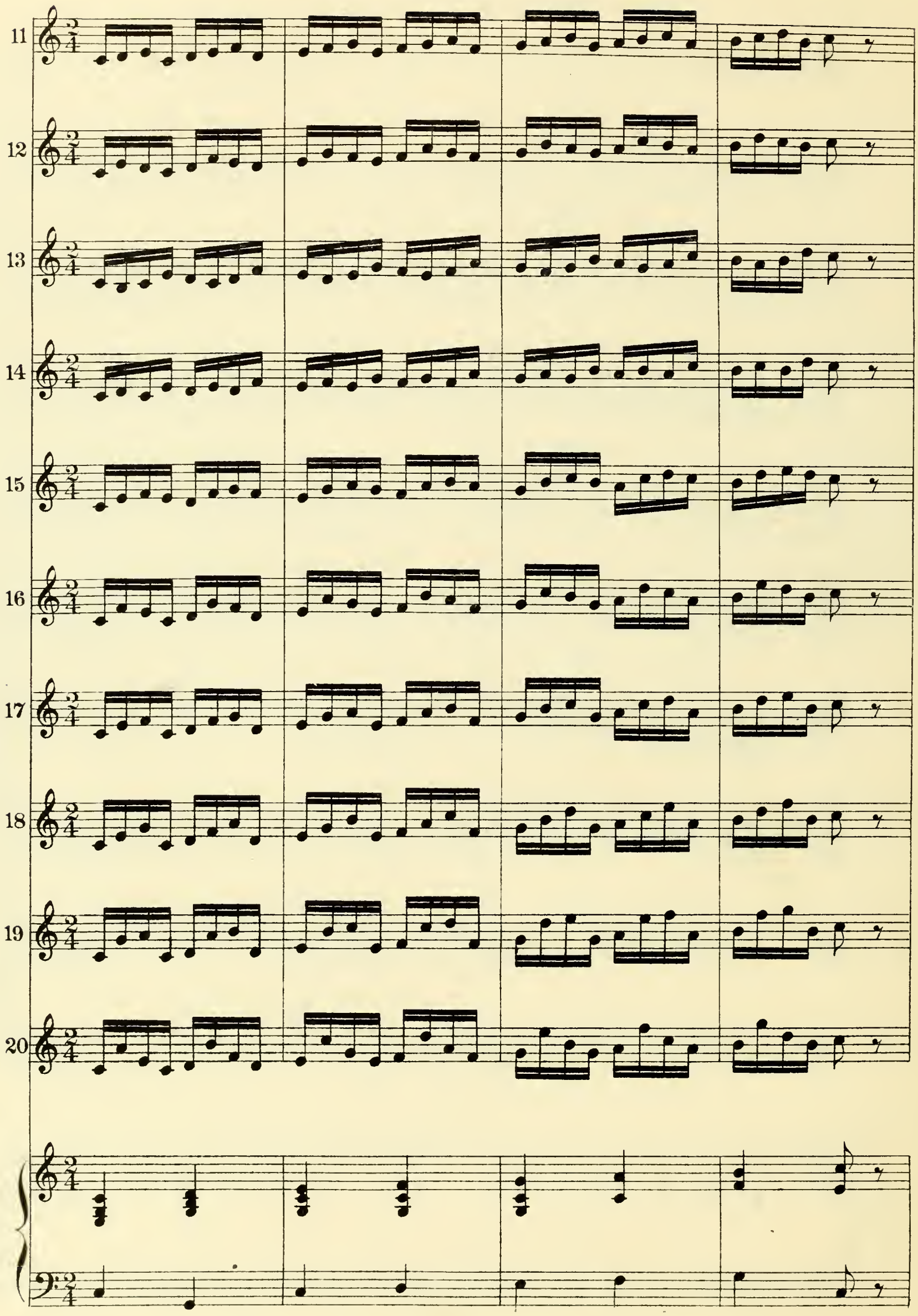
79.
C.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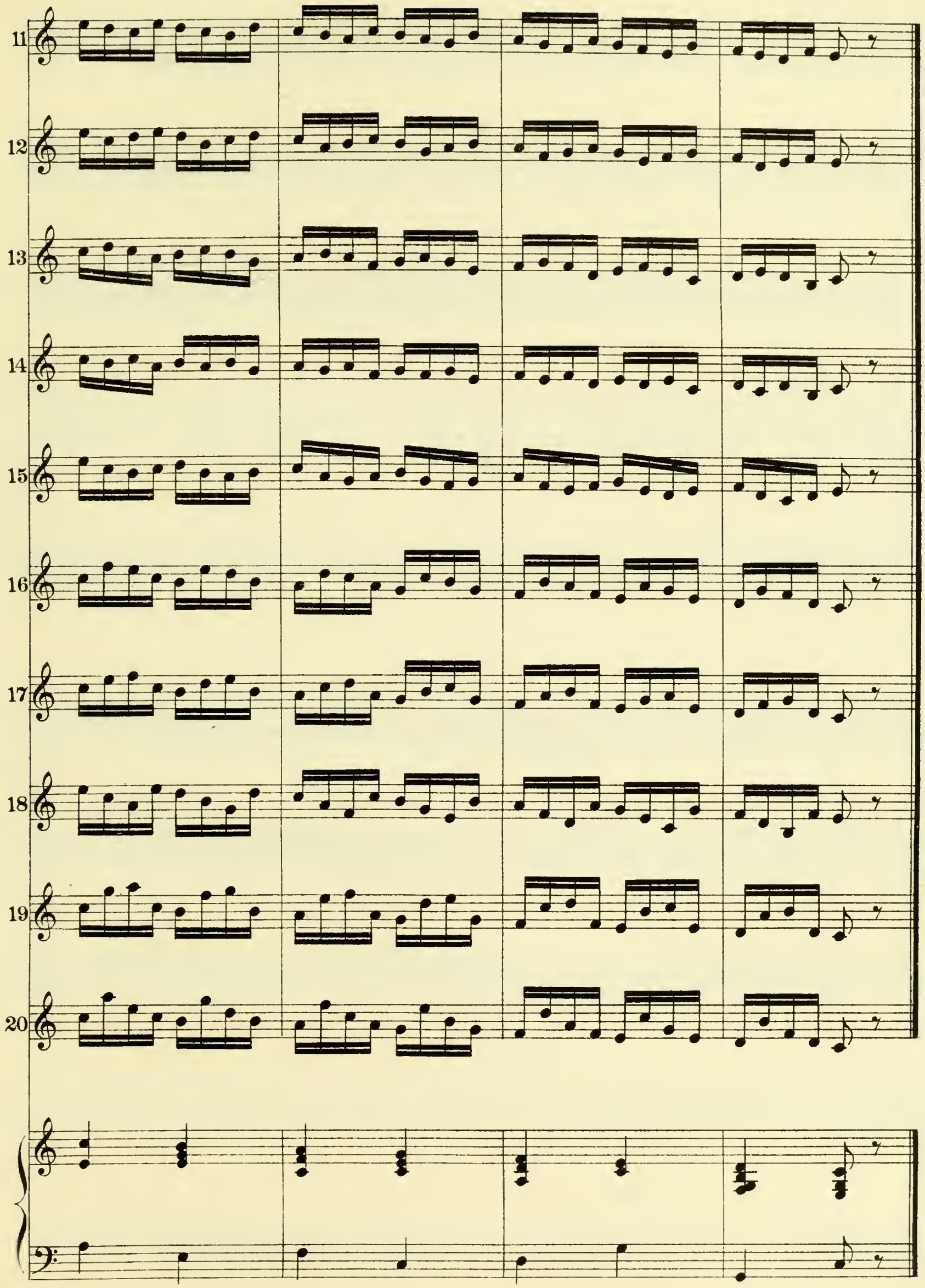
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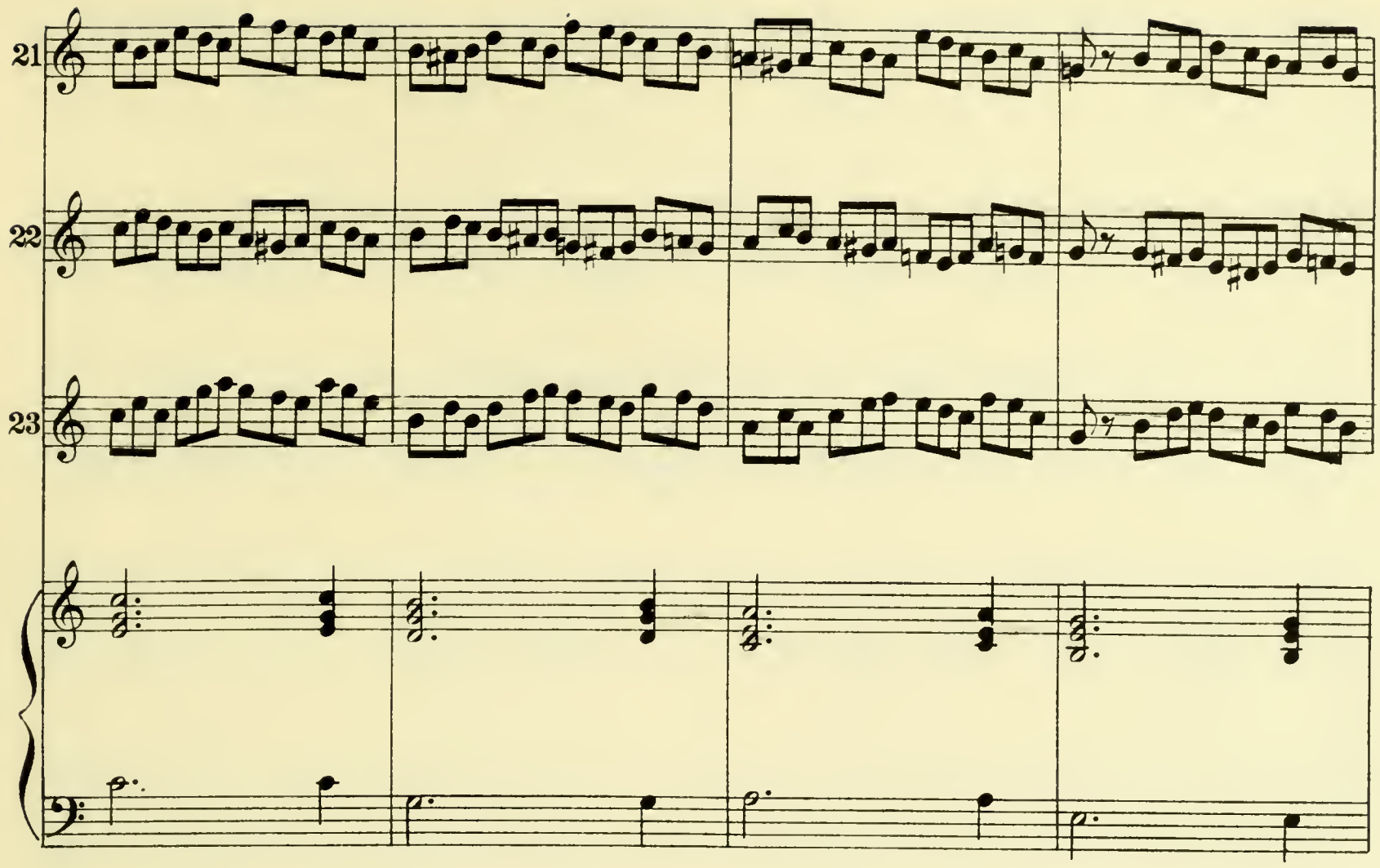
Andante.

21

22

23

Andante.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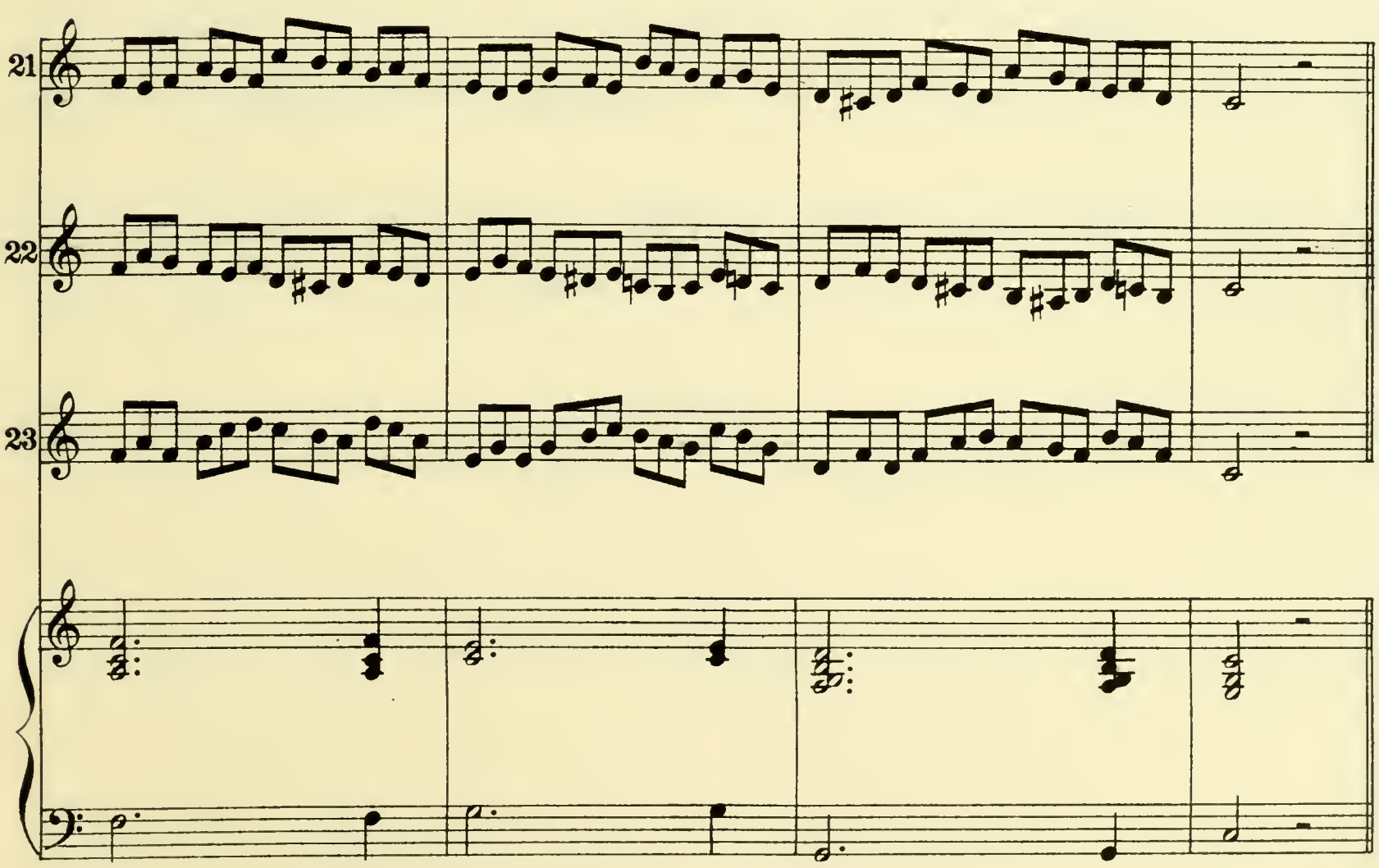
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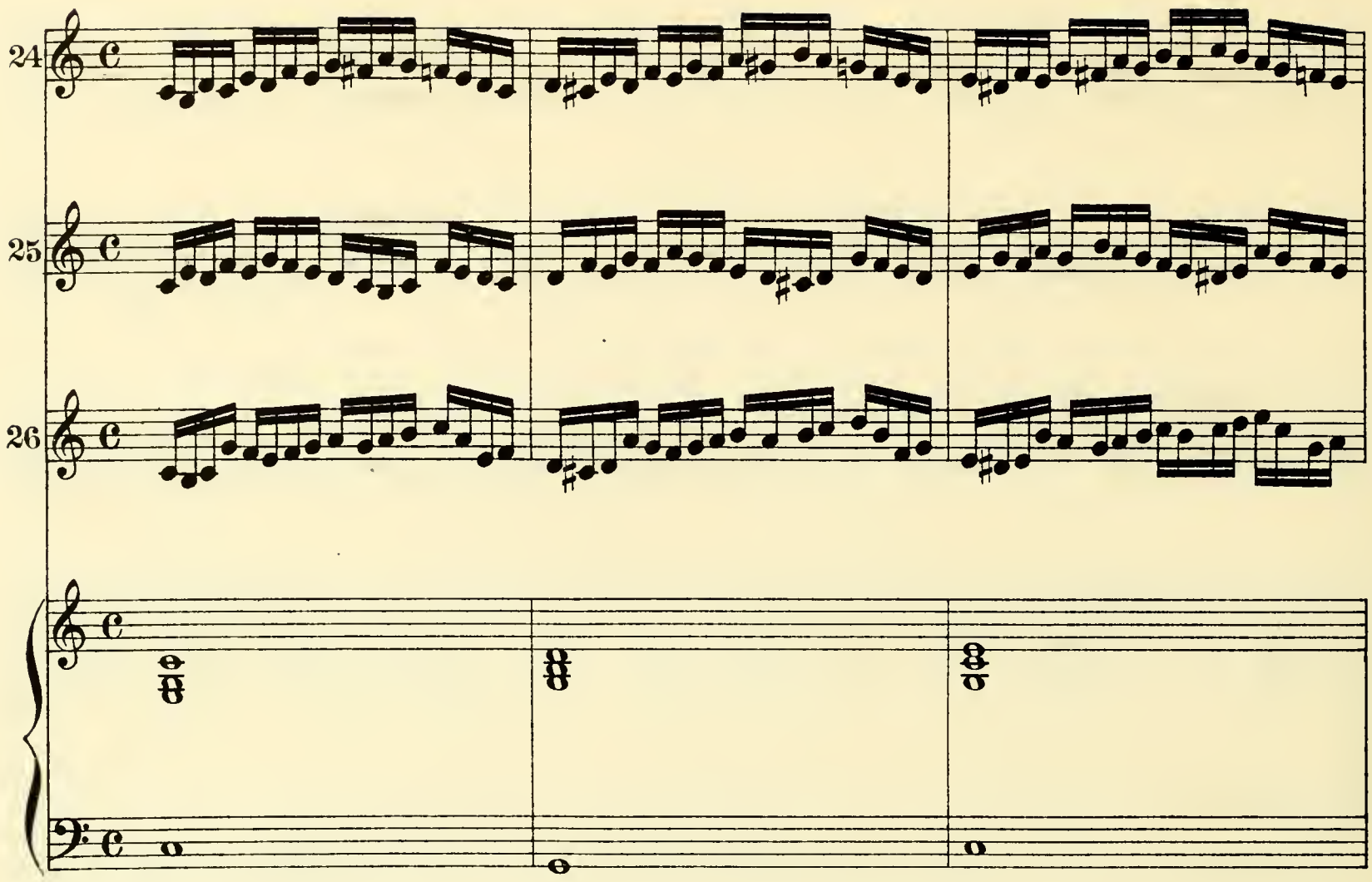
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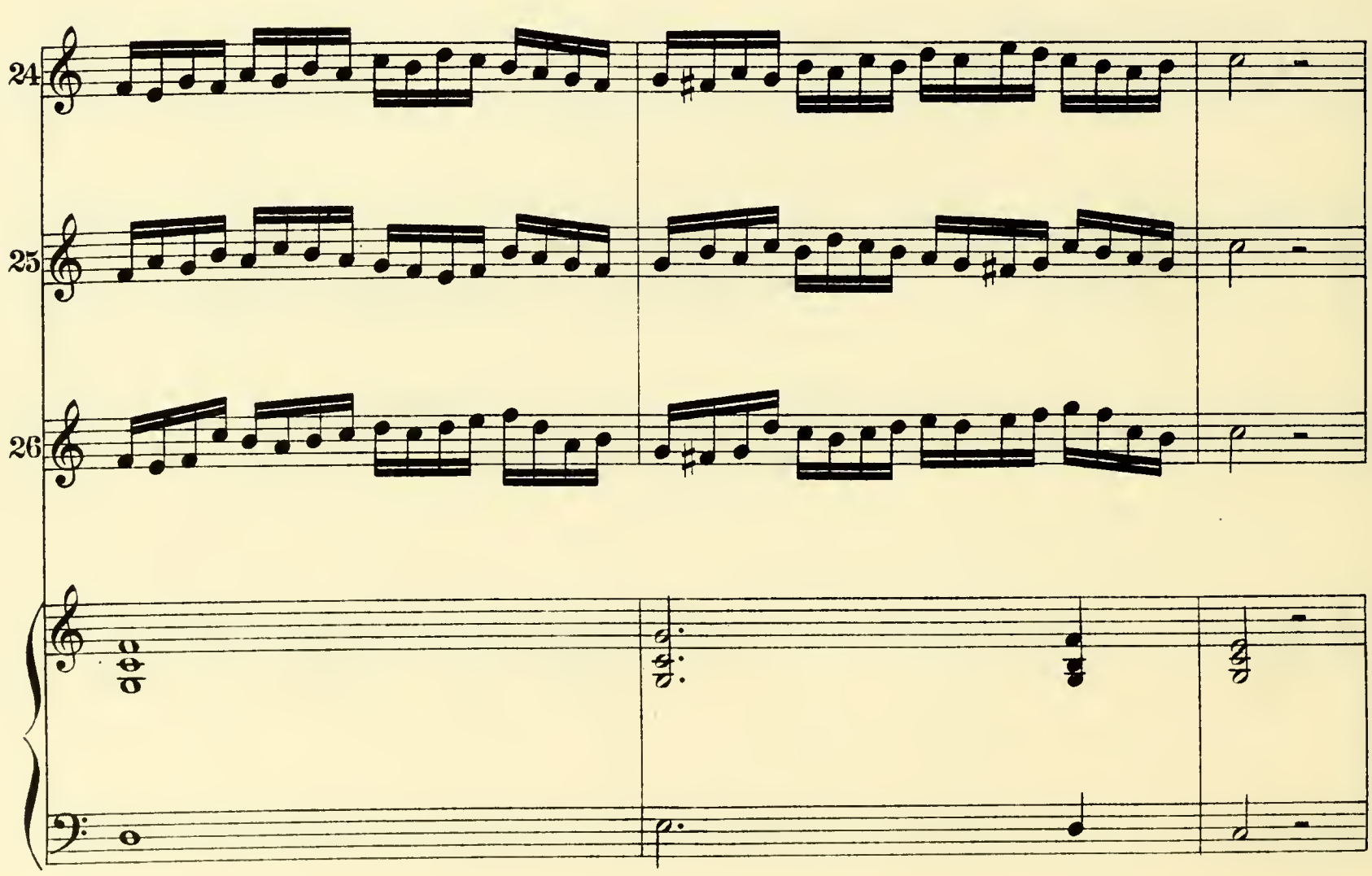
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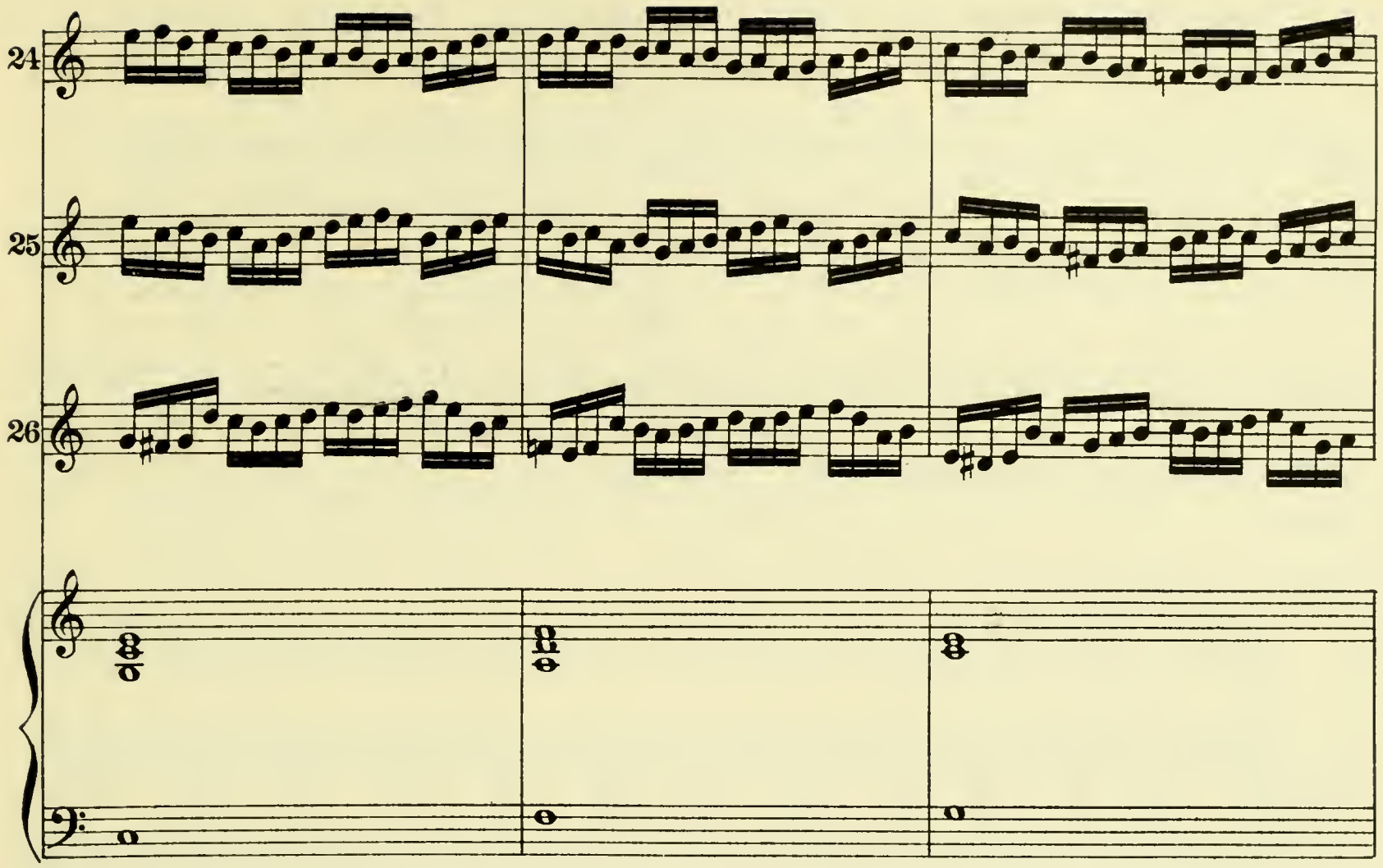
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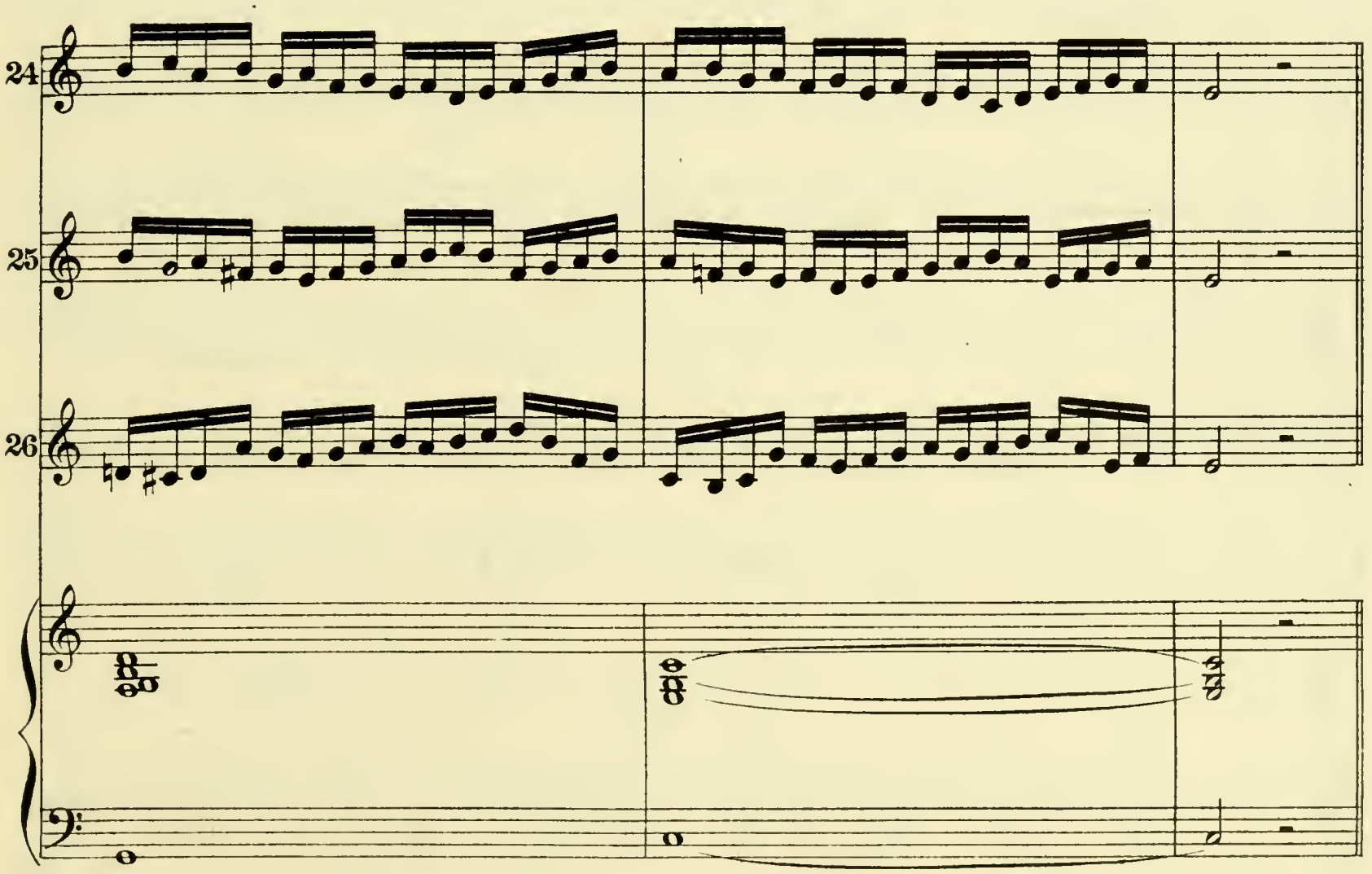
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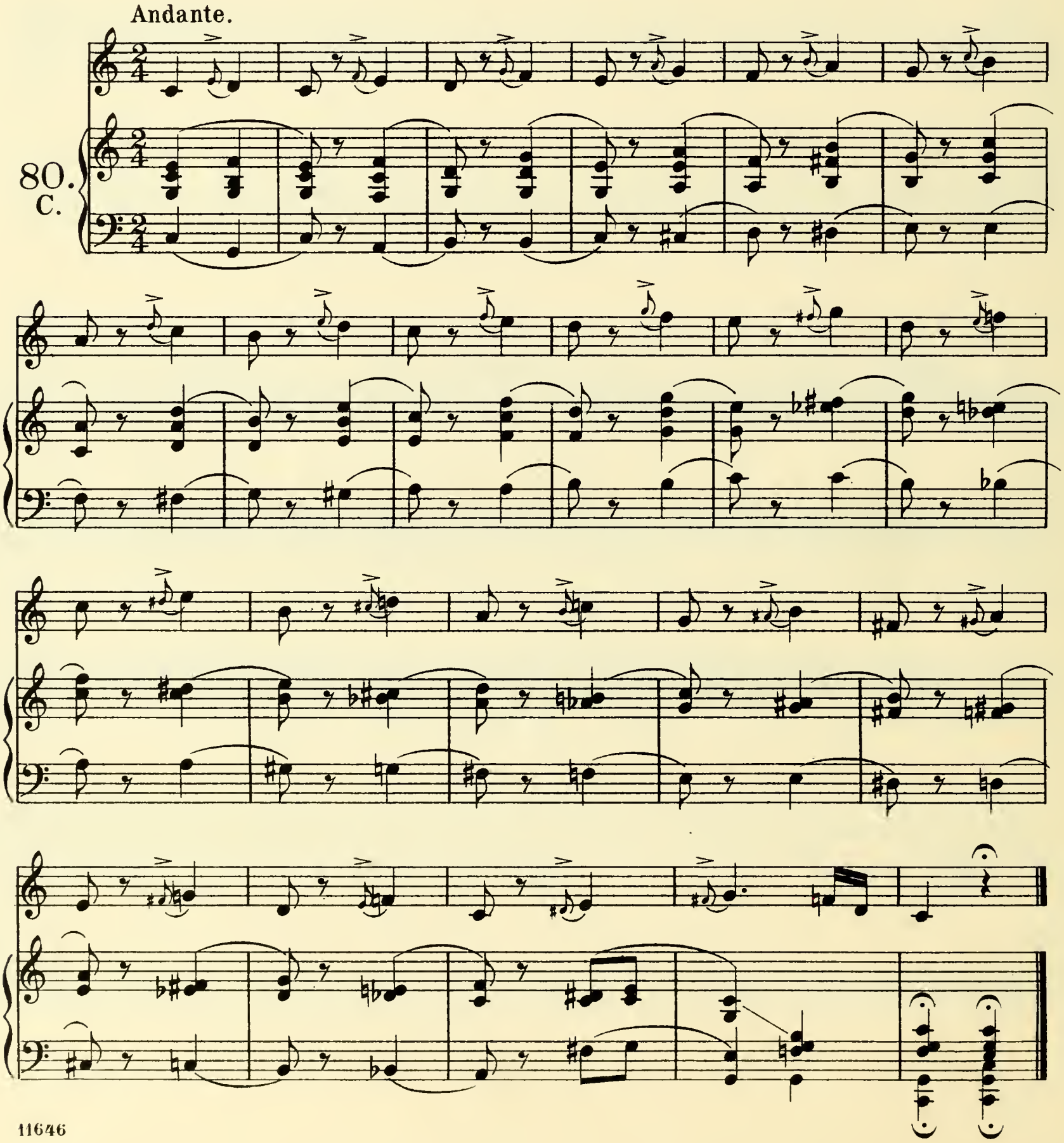
Second Lesson.

Appoggiatura, Gruppetto, Staccato, Flautato, Repeated Sounds and Triplets.

Appoggiaturas are classed as *simple appoggiaturas* and *acciaccaturas* or *crushed notes*. Both may be placed at various intervals (a second or more) from the note to which they gravitate; the *simple appoggiatura* takes one-half of the value attributed to its principal note, while the *acciaccatura* glides promptly on to the principal note. Both *appoggiaturas* receive from the voice an accent more marked than that given to the principal note; but while the first, by its value, offers the voice opportunity for expansion, the second, because of its rapidity, cannot do so; consequently it carries its accent on to the note on which it falls, while producing for itself a more vigorous shock of the air that passes the glottis, that is, the stroke of the vocal cords for the *acciaccatura* is more vigorous than that for the *appoggiatura*.

In the following exercises we mark this difference by the sign > for the *appoggiatura*, and this ∧ for the *acciaccatura*.



Andante.

81.
C

mf *cresc.* *f*

mf *cresc.*

p

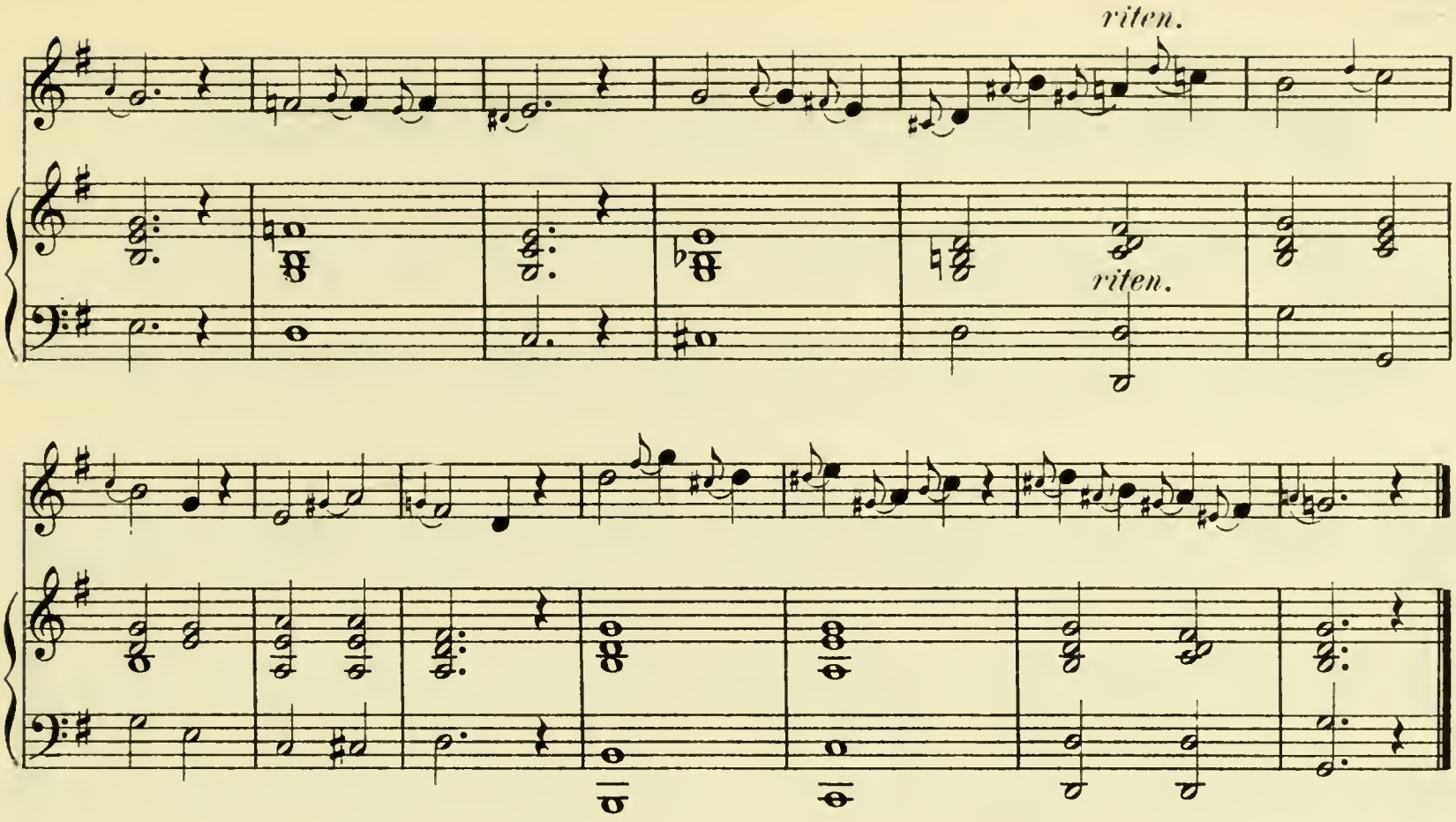
p

f

f

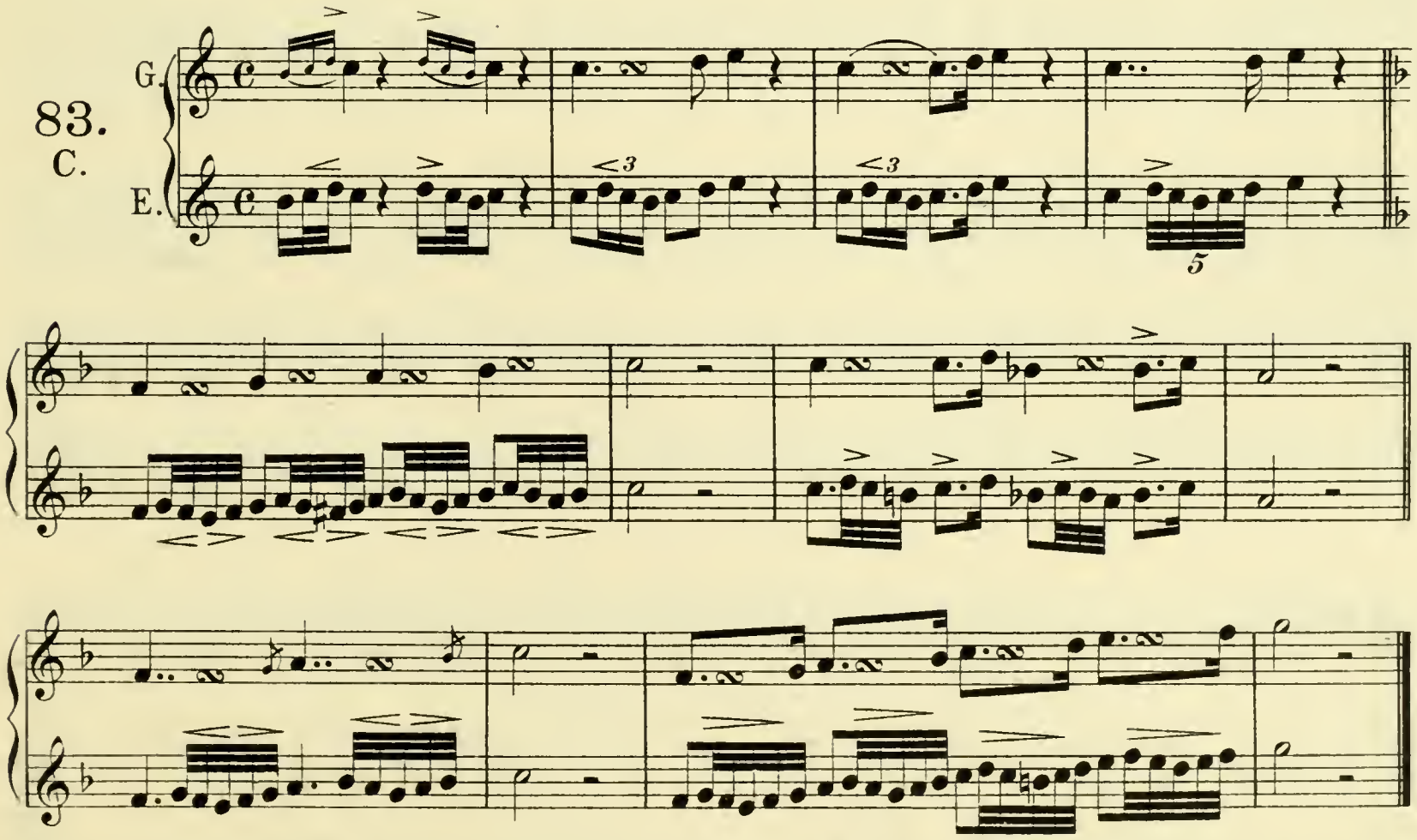
Andantino.

82.
G.



The gruppetto.

The *gruppetto,* with regard to the attack of the vocal tone, follows the order indicated for the *appoggiatura;* we must notice, however, that the accent which extends to several notes in succession is more marked on the highest note: we shall give some examples. The first line, marked by the letter G, gives the ordinary notation, while the second marked E, illustrates the execution.



The exercises following this first example serve to extend the scope of its practical execution.

Andante.

84.
F.

Andante.

85.
G.

Andante sostenuto.

86.
F.

Andante.

87.
F.

Andante cantabile.

dolce

88.
E.

p

f

p

p

f

f

cresc.

f

mf

p

cresc.

f

mf

p

pp

mf

pp

mf

Allegro maestoso.

89.
C.

Ped.

Allegro maestoso.

90.
G.

p

Andante maestoso.

91.
B♭.

sf p sf p

sf sf p

f p

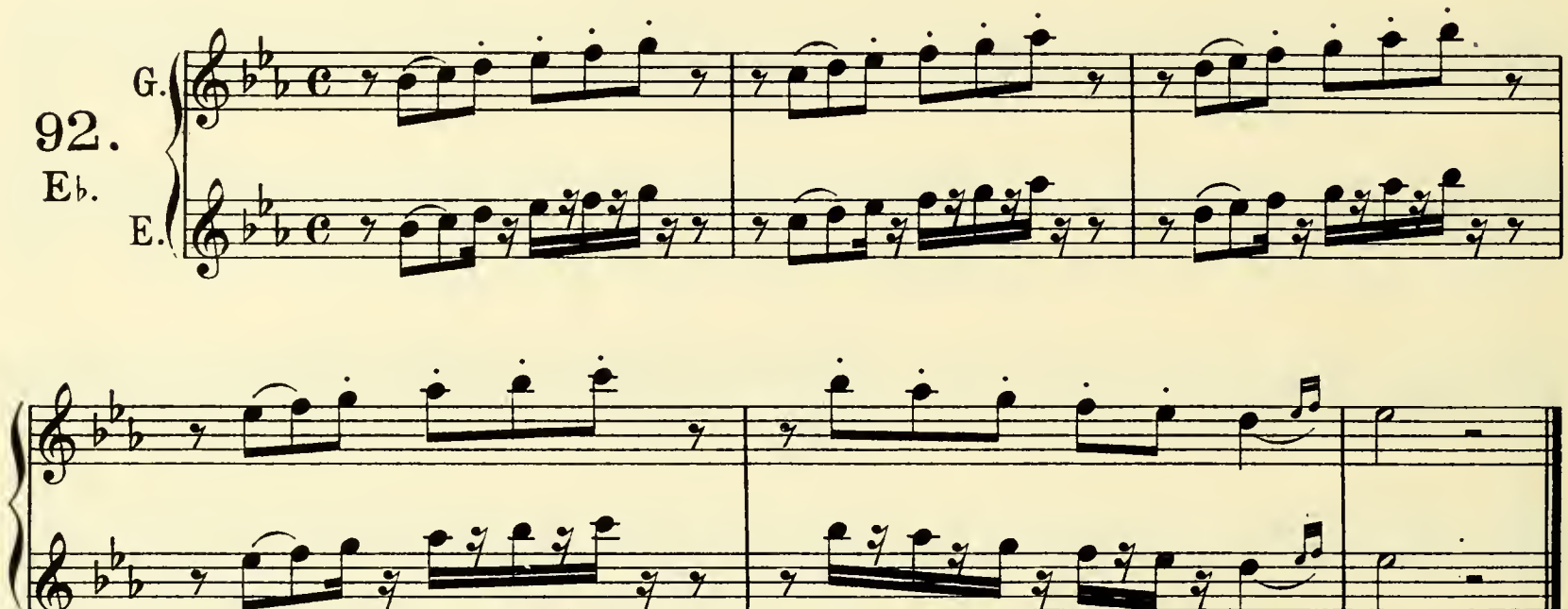
sf

sf

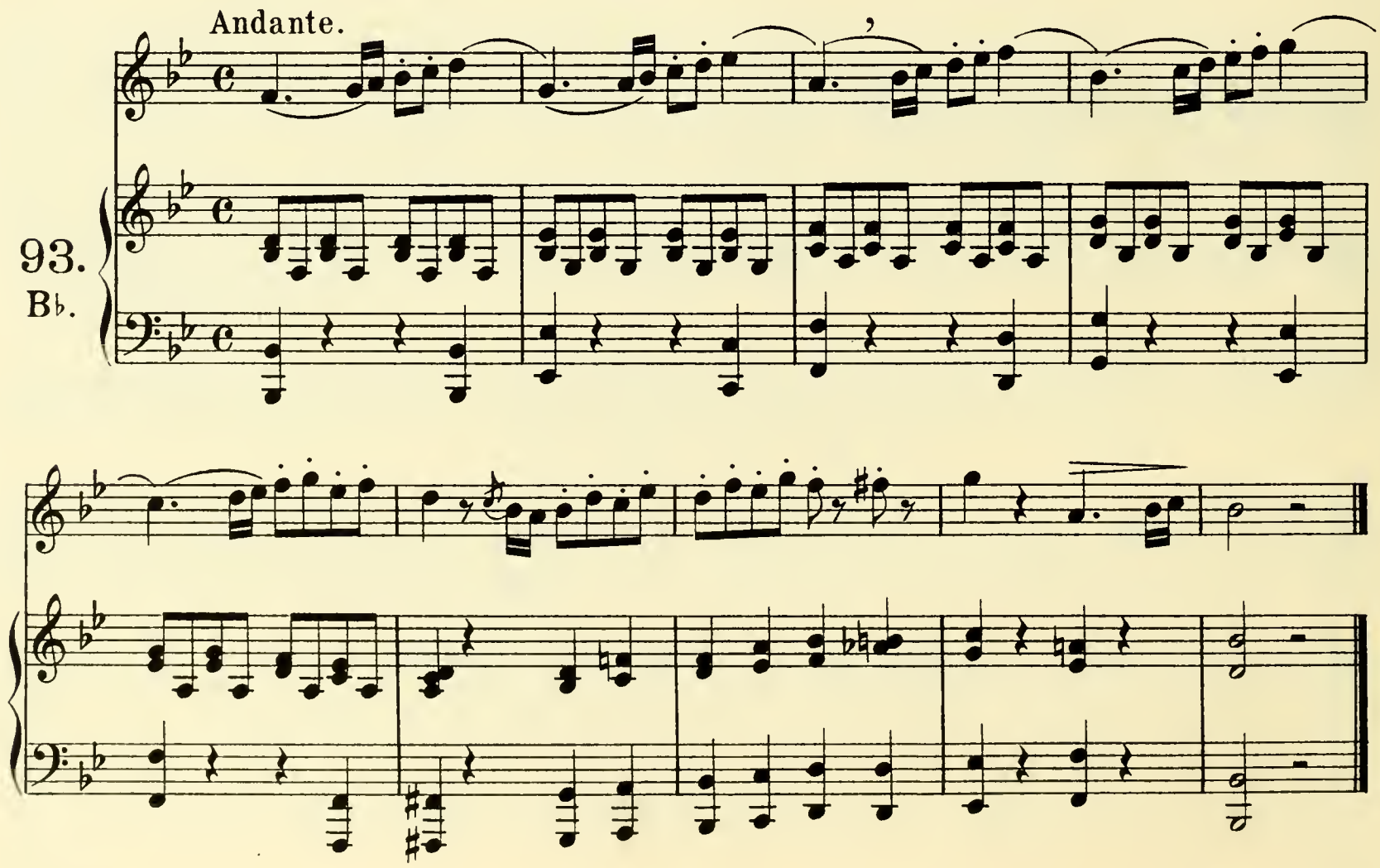
Staccato Tones.

The *staccato* is produced by a slight contraction of the vocal cords: the expiration of the air must be very light. Its acoustic effects and execution resemble a succession of tones the duration of which is so short that they produce the effect of being instantly stopped by a rest equally short. The following example makes our explanation clearer.
The letter G marks the notation, and E the execution.

92.
E♭.



93.
B♭.



Andantino.

94.
D.

Allegro moderato.

95.
C.

ha! ha! ha! ha! ha!

We give here two more exercises on Staccato tones, but with the *staccato* preceded by (or issuing from) a *legato* tone.

Largo.

96.
C.

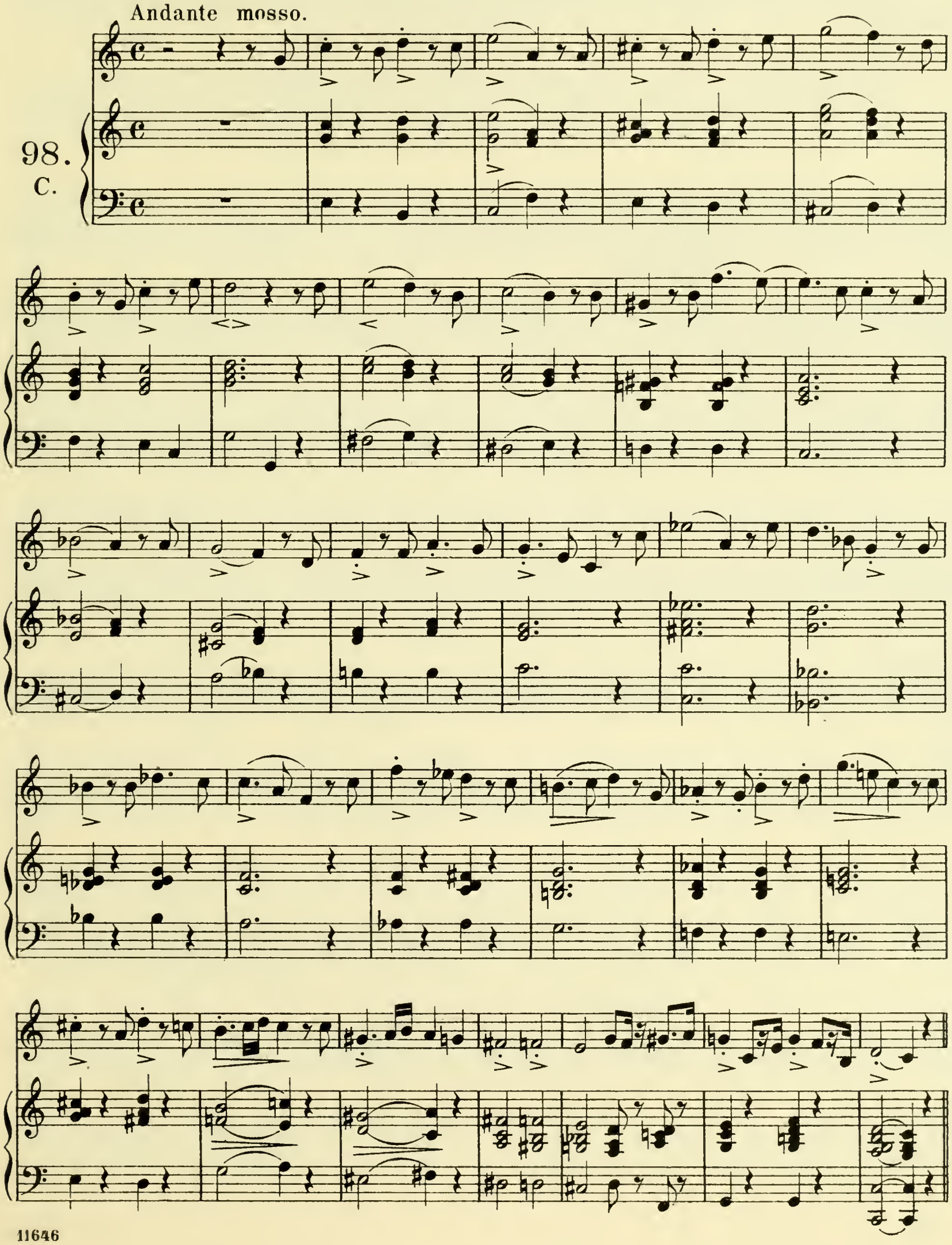
Largo.

simile

97.
C.

Flautato Tones.

The *flautato* is executed in the same way as the *staccato*, but slightly prolonged by an instantaneous *decrescendo*. When the notes to be sung *flautato* are joined in groups, each tone is carried on to the following one without being detached, so that the vibrations of the vocal cords, while remaining the same, produce the effect of a succession of undulations, so to speak, on account of the *decrescendo* promptly executed on each tone, although bound to the following one.



Allegro moderato.

99.
A.

f *p*

Andante.

100. C.

a tempo.

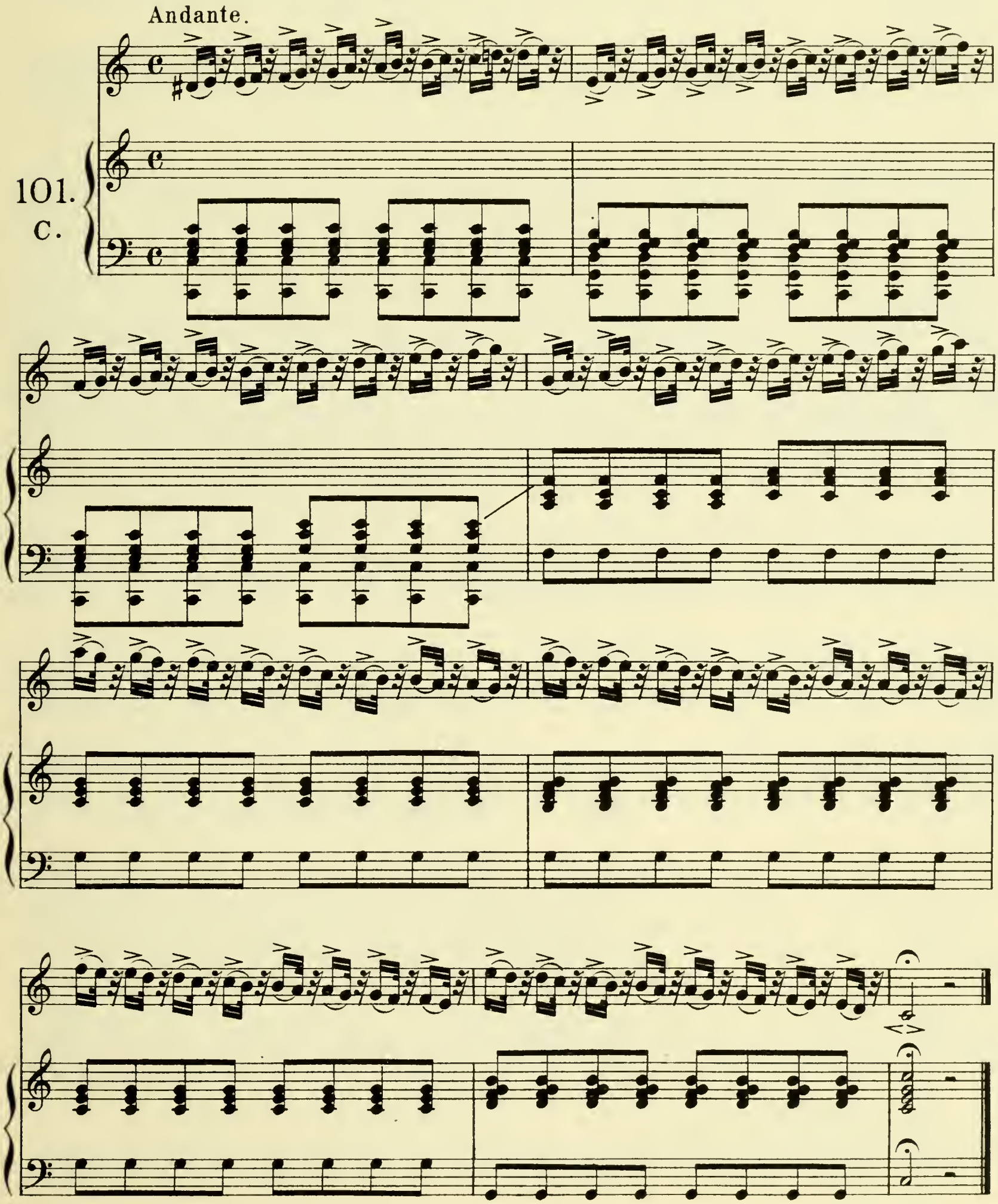
rit.

rit.

a tempo.

Repeated Tones.

For *repeated* tones the vocal cords are set in vibration in the same way as for the *staccato* and *flautato;* but the effect produced is not the same, for the notes being commonly grouped by twos, and the *decrescendo* falling on the first, the effect of this almost effaces that of the second; thus the most marked accent falls on the first note; it follows that the second unison receives a more vigorous impulse than that given to the first.



Andante sostenuto.

102.
E♭ m.

Syncopation.

Syncopation produces remarkable results, above all with regard to expression; this irregularity of measure must be very noticeably marked by the voice; this is effected by a slight stroke of the vocal cords, but care must be taken not to let a great quantity of air escape.

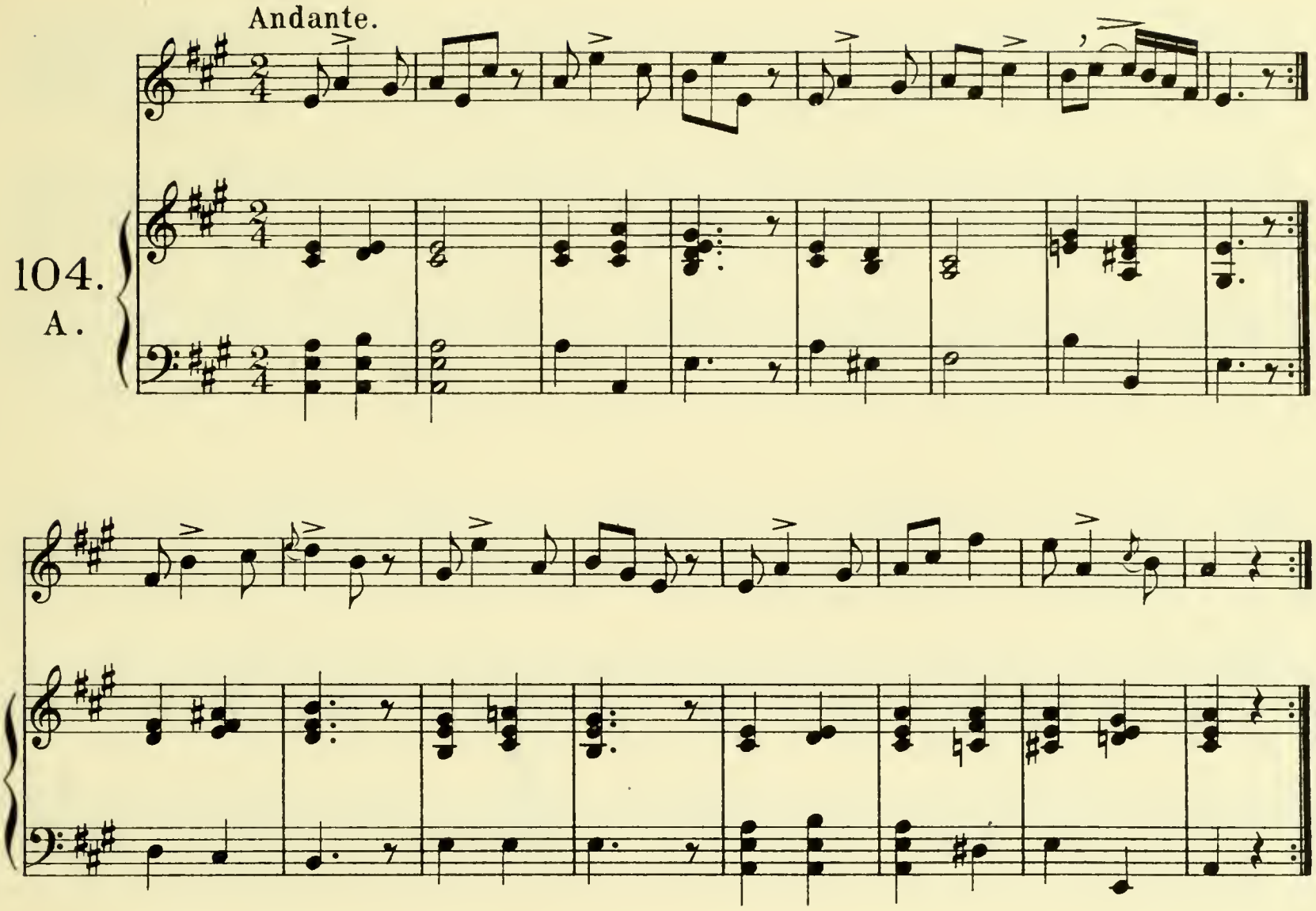
103.
C.

Allegretto.

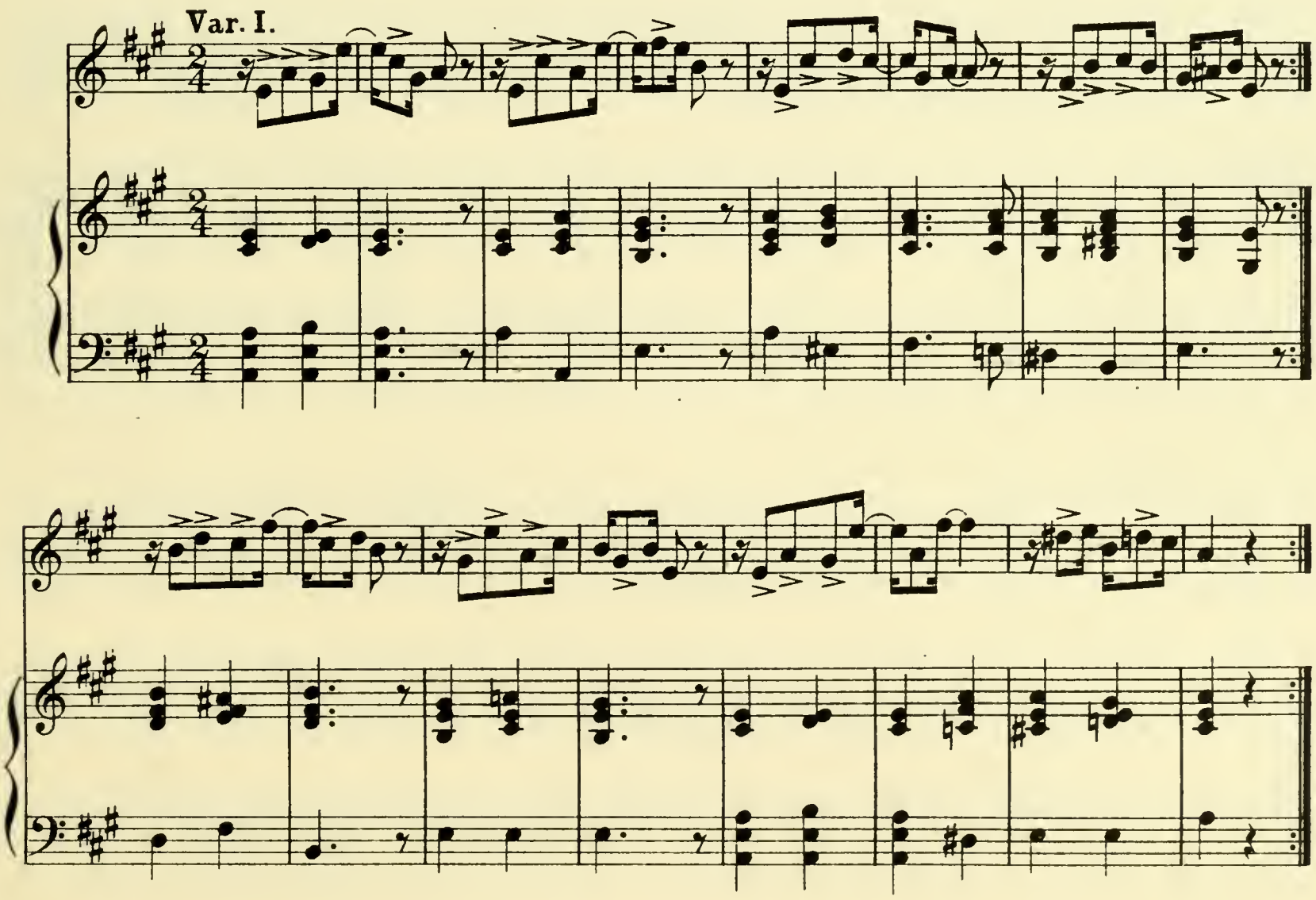
Allegro.

Theme.
Andante.

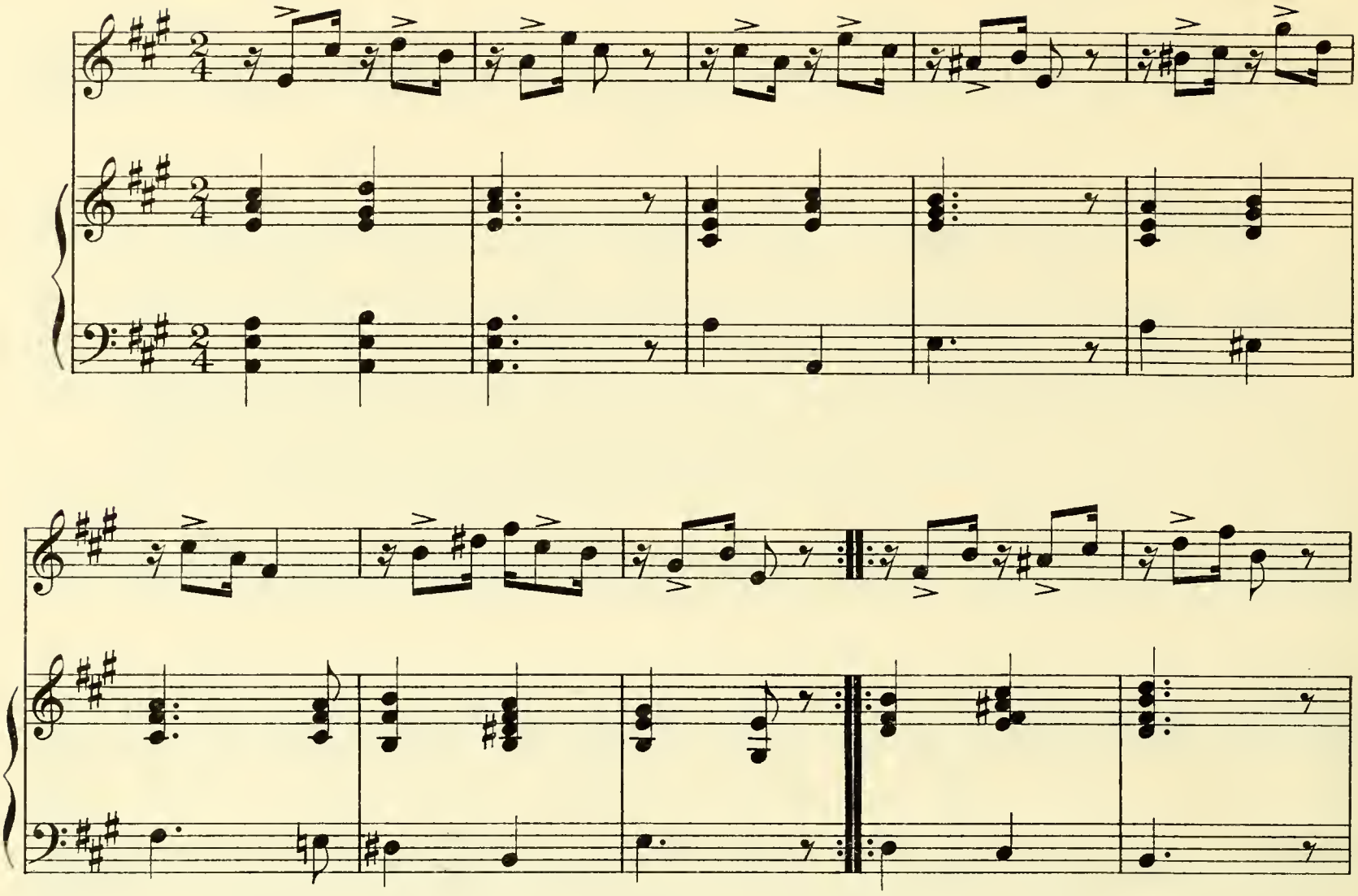
104.
A.

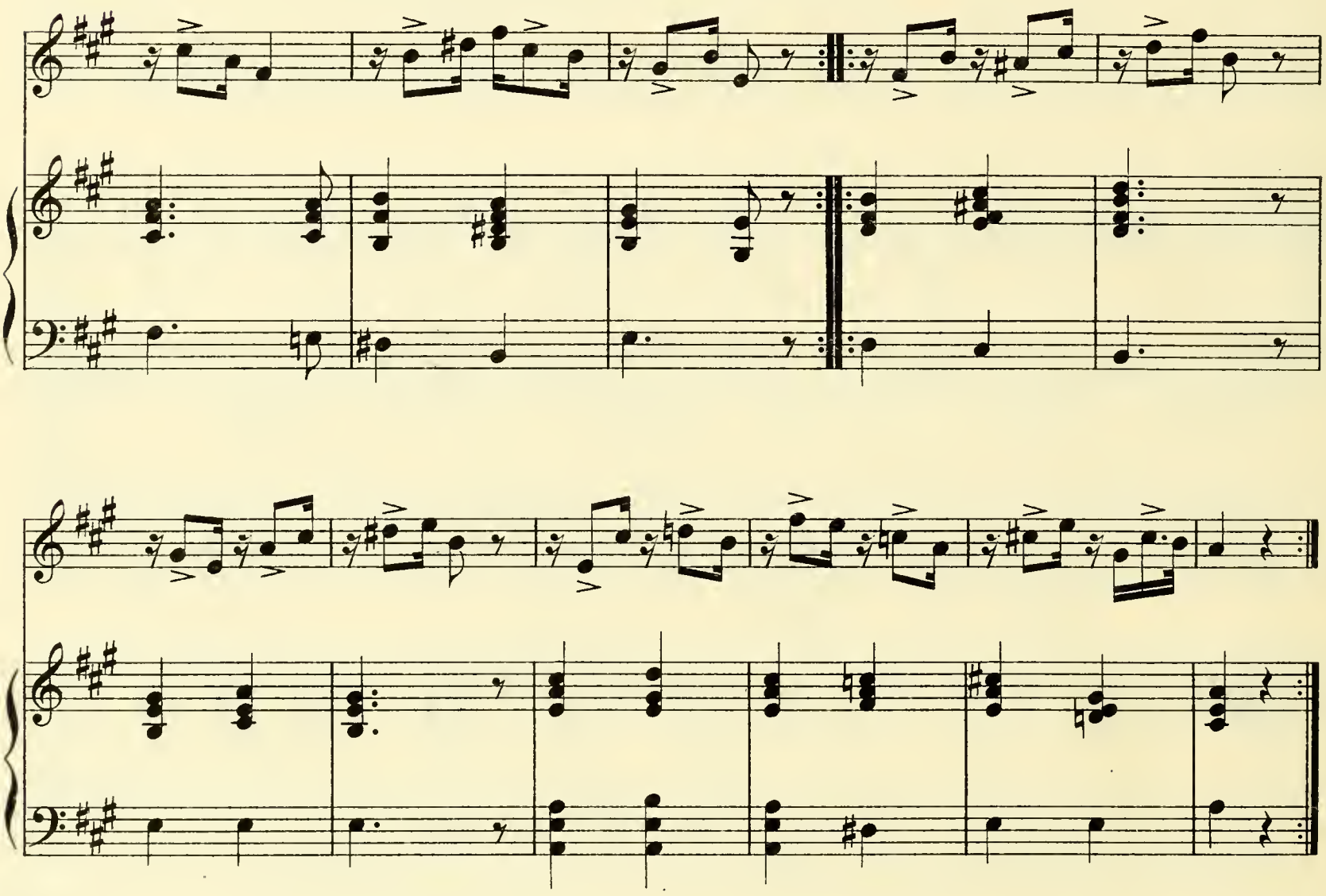


Var. I.

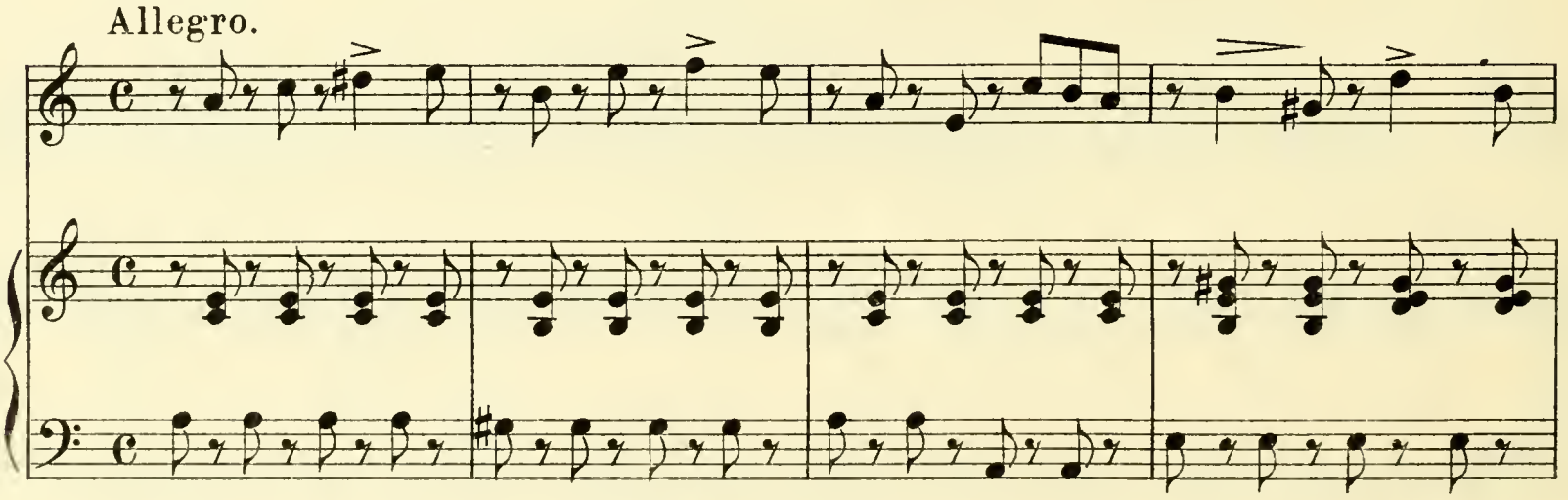


Var. II.





Allegro.



cresc.

f

ff

cresc.

f

ff

f

f

p

ff

p

ff

f

f

Triplets.

The execution of triplets presents great difficulties. There are two tendencies to be avoided; that of disjoining the notes in ascending passages, and that of running them together in descending ones.

We shall acquire perfect equality by reversing the accent, as we have indicated for the scales.

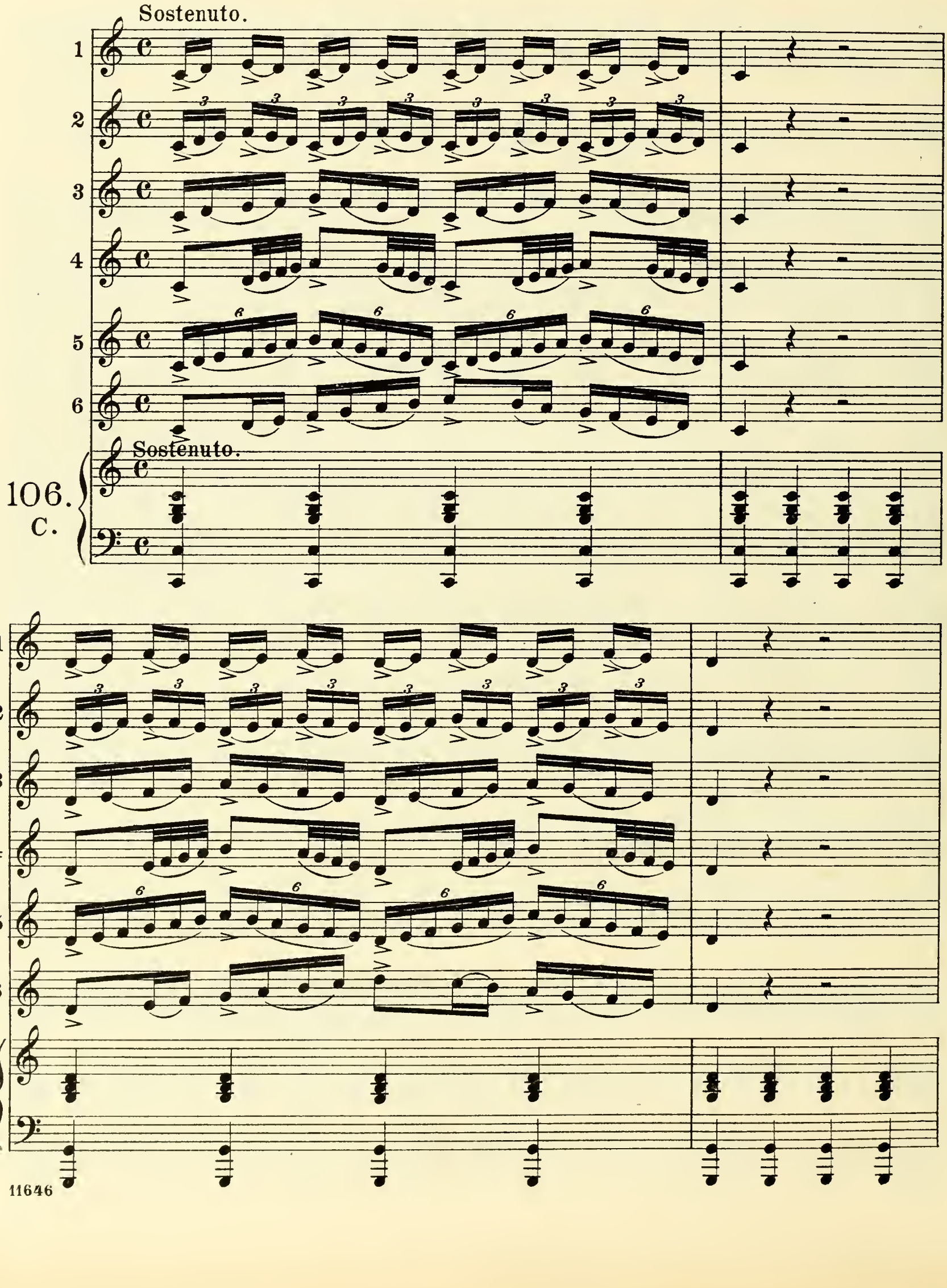
Allegretto.

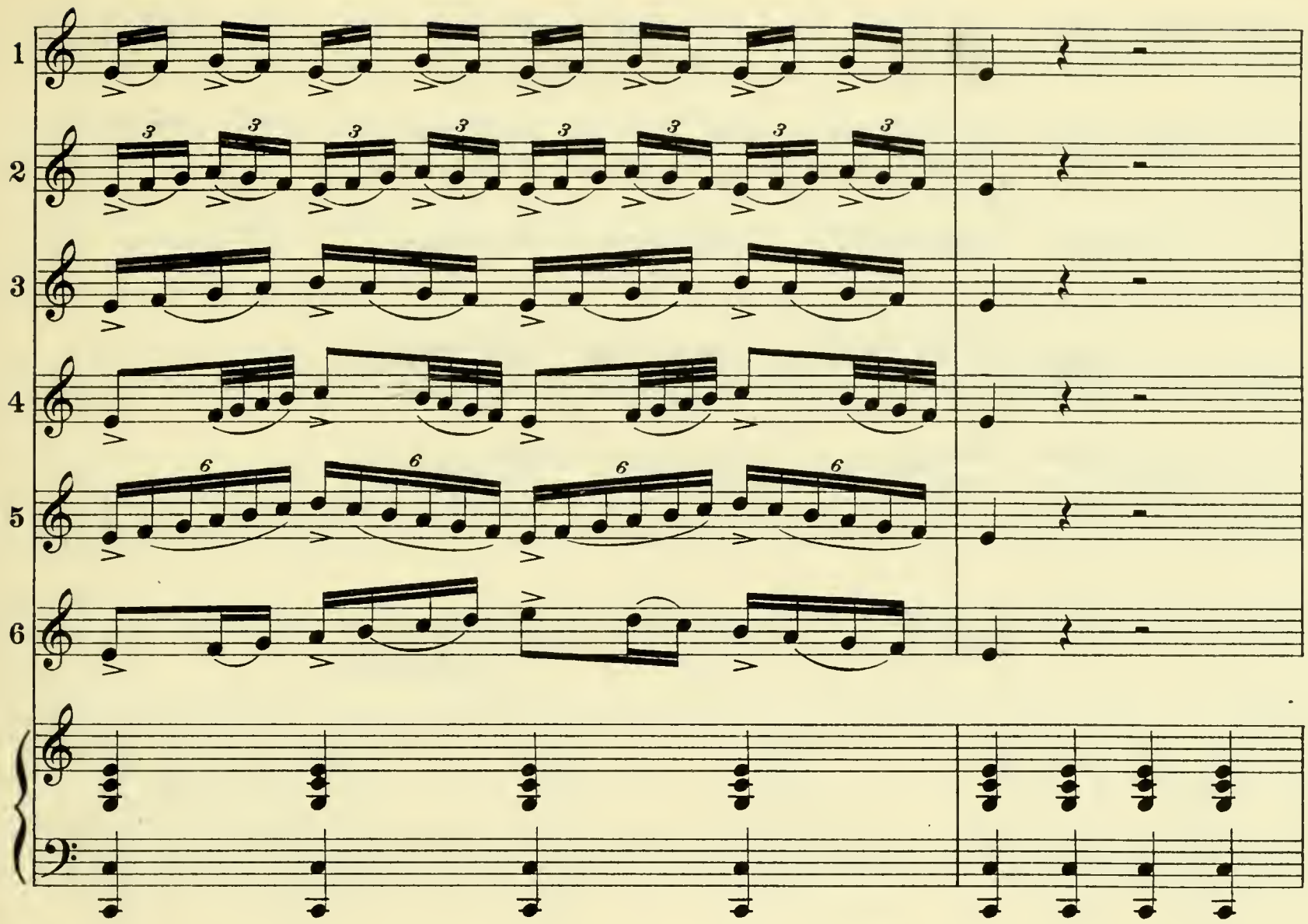
105.
C.

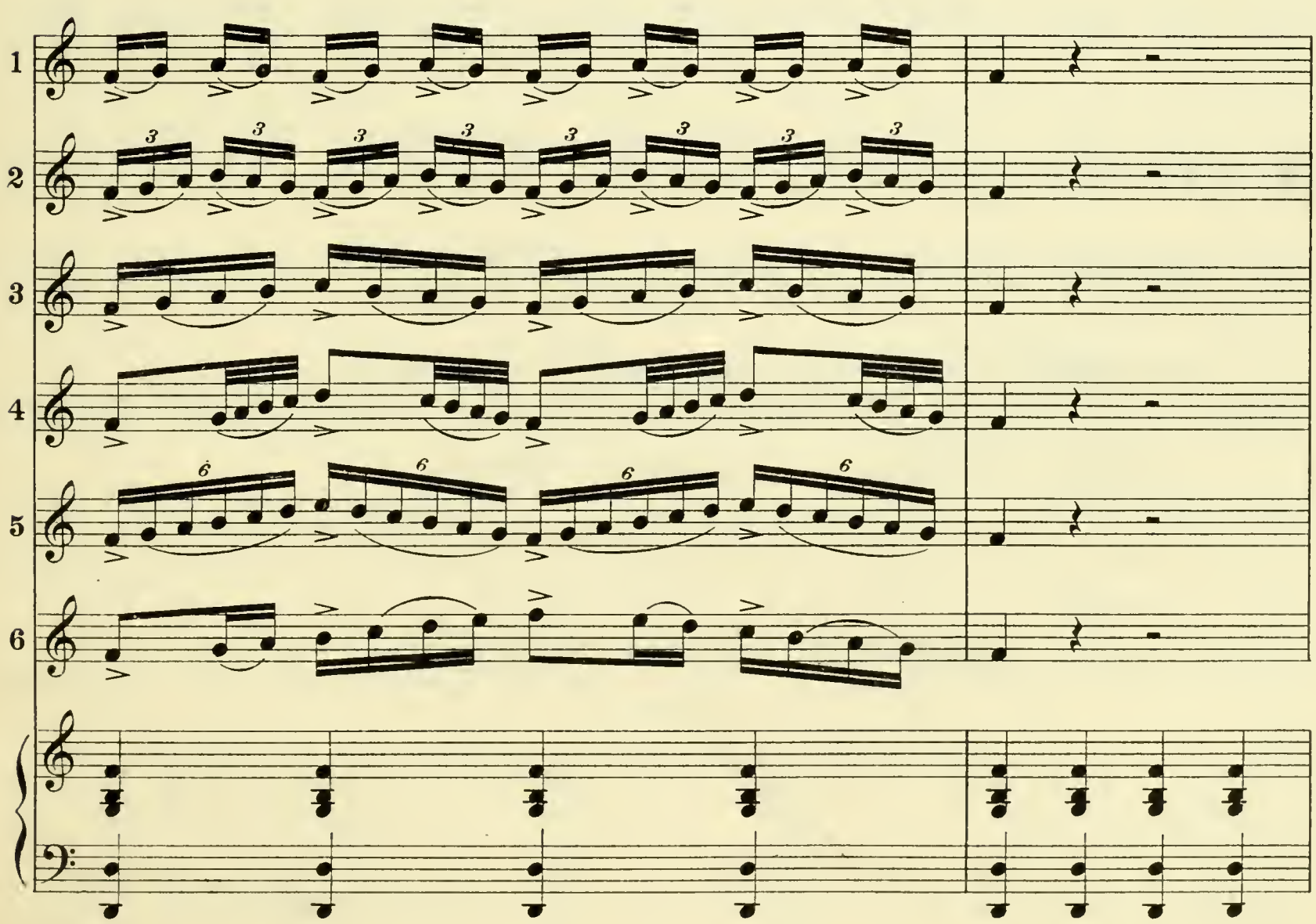
The Diatonic Scales.

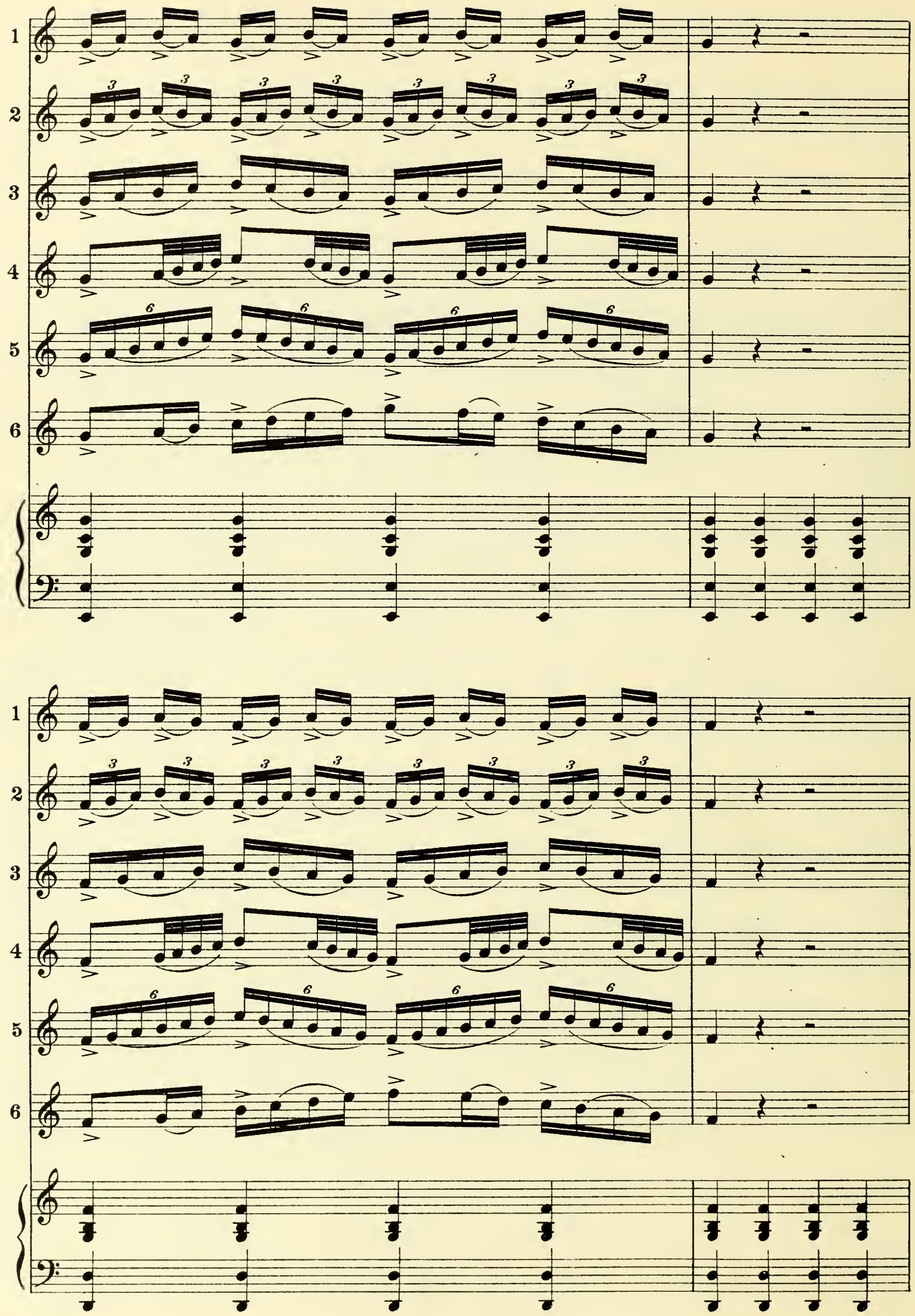
The *Scales* are of two kinds, the *diatonic* and the *chromatic,* both of them often employed in rapid singing. The study of the scales ought to be the more diligently practised, as it contributes greatly to render the voice flexible and homogeneous in all its timbres.

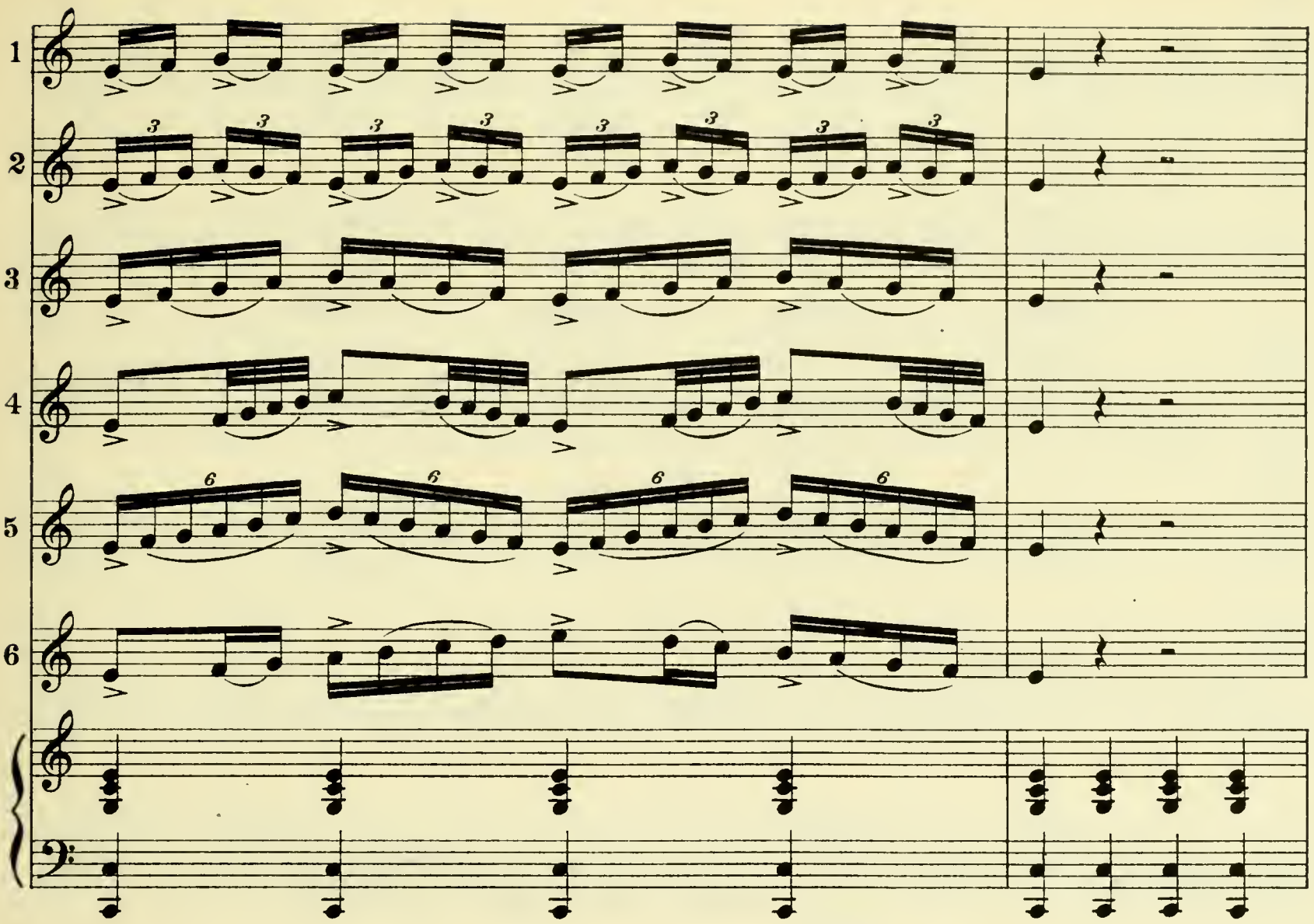
An easy and correct execution of the scales, which reveals the skill of the singer, consists in the purity of each tone, in the blending of the *crescendo* and *decrescendo,* and in the accents applied without tension to the first note of each group composing the whole of the scale; but the pupil must take care that the effect of one tone does not diminish that of the next.

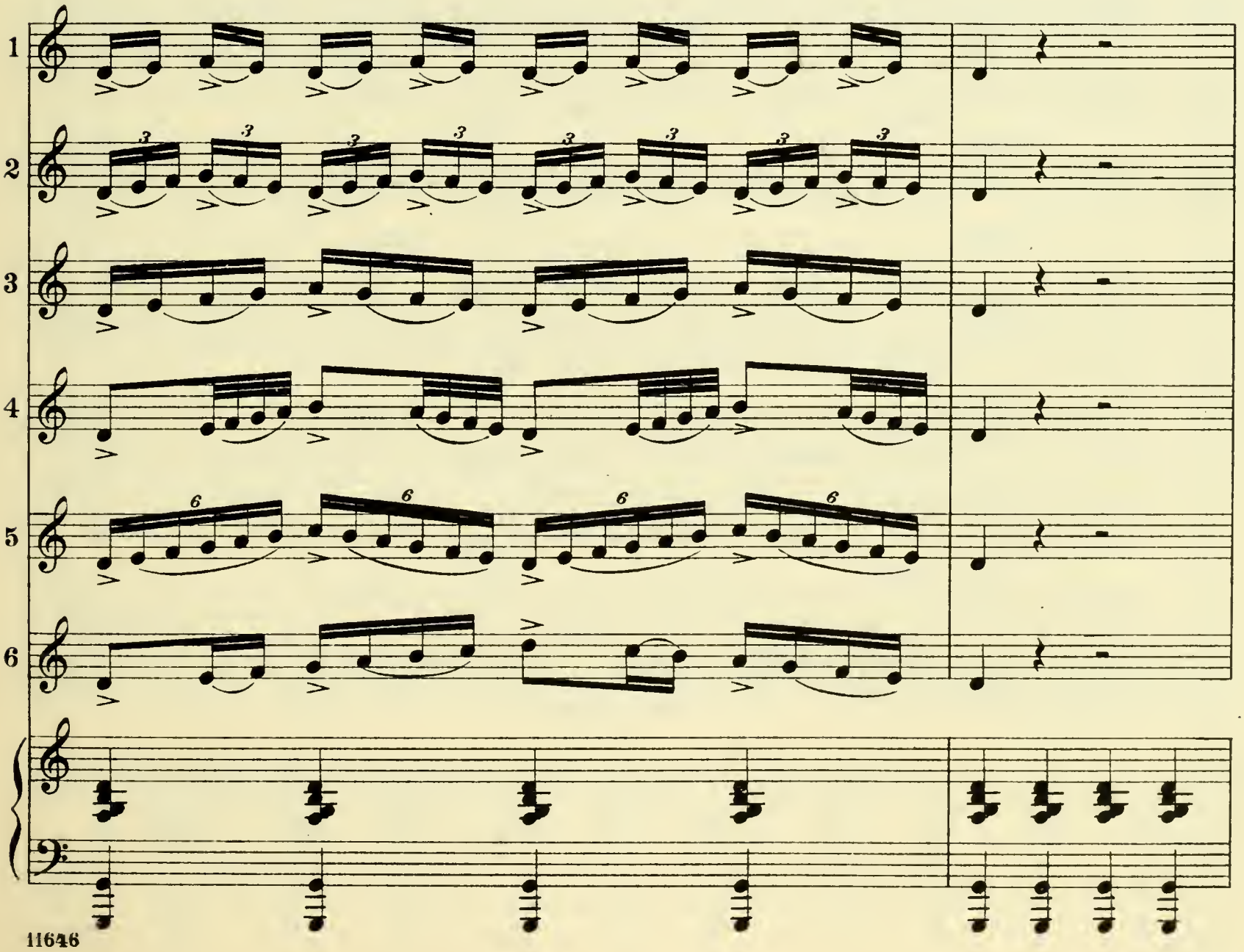


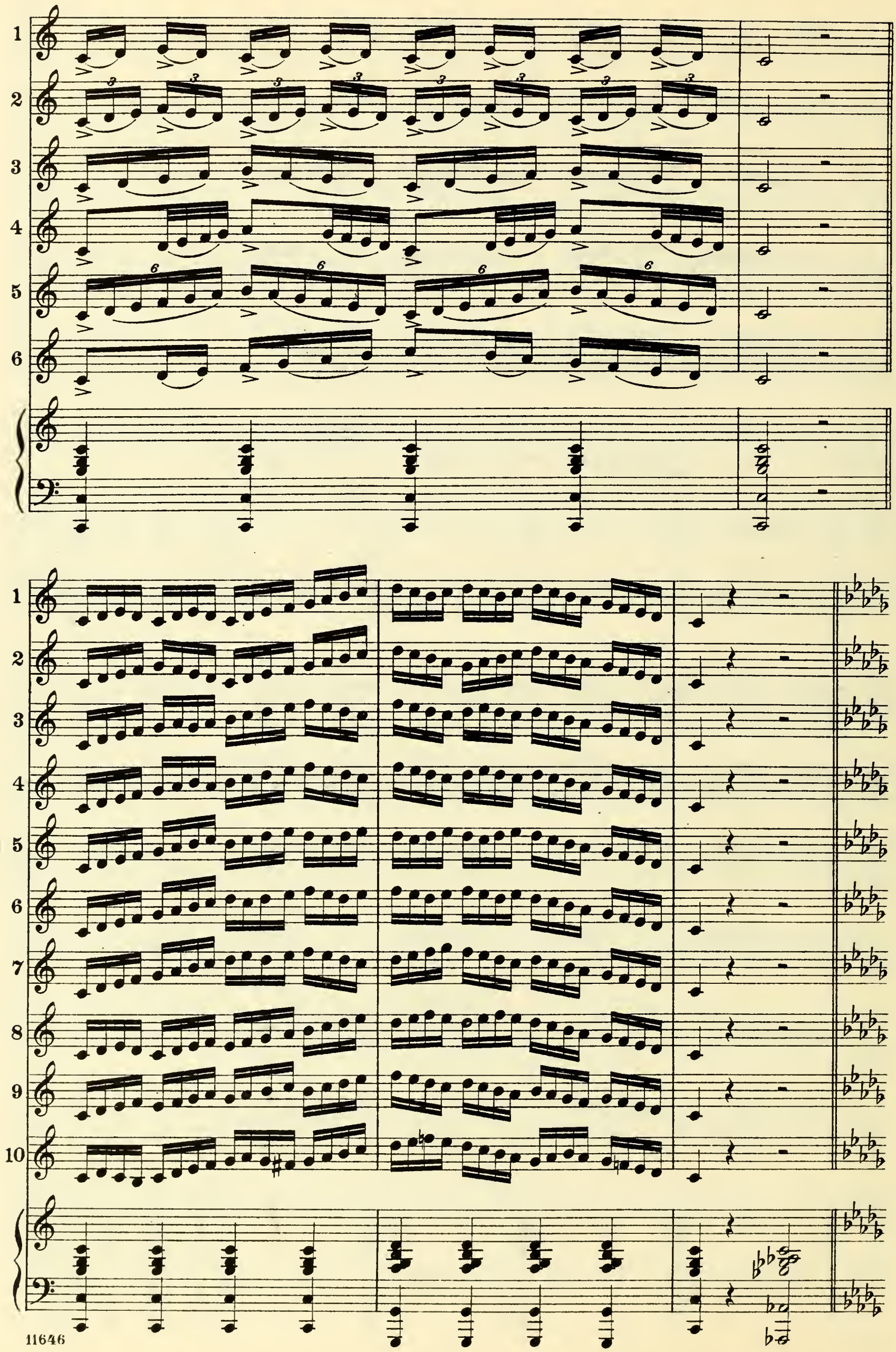

1
2
3
4
5
6


1
2
3
4
5
6


1
2
3
4
5
6
3
6


1
2
3
4
5
6


1
2
3
4
5
6



1 *etc.*

2 *etc.*

3 *etc.*

4 *etc.*

5 *etc.*

6 *etc.*

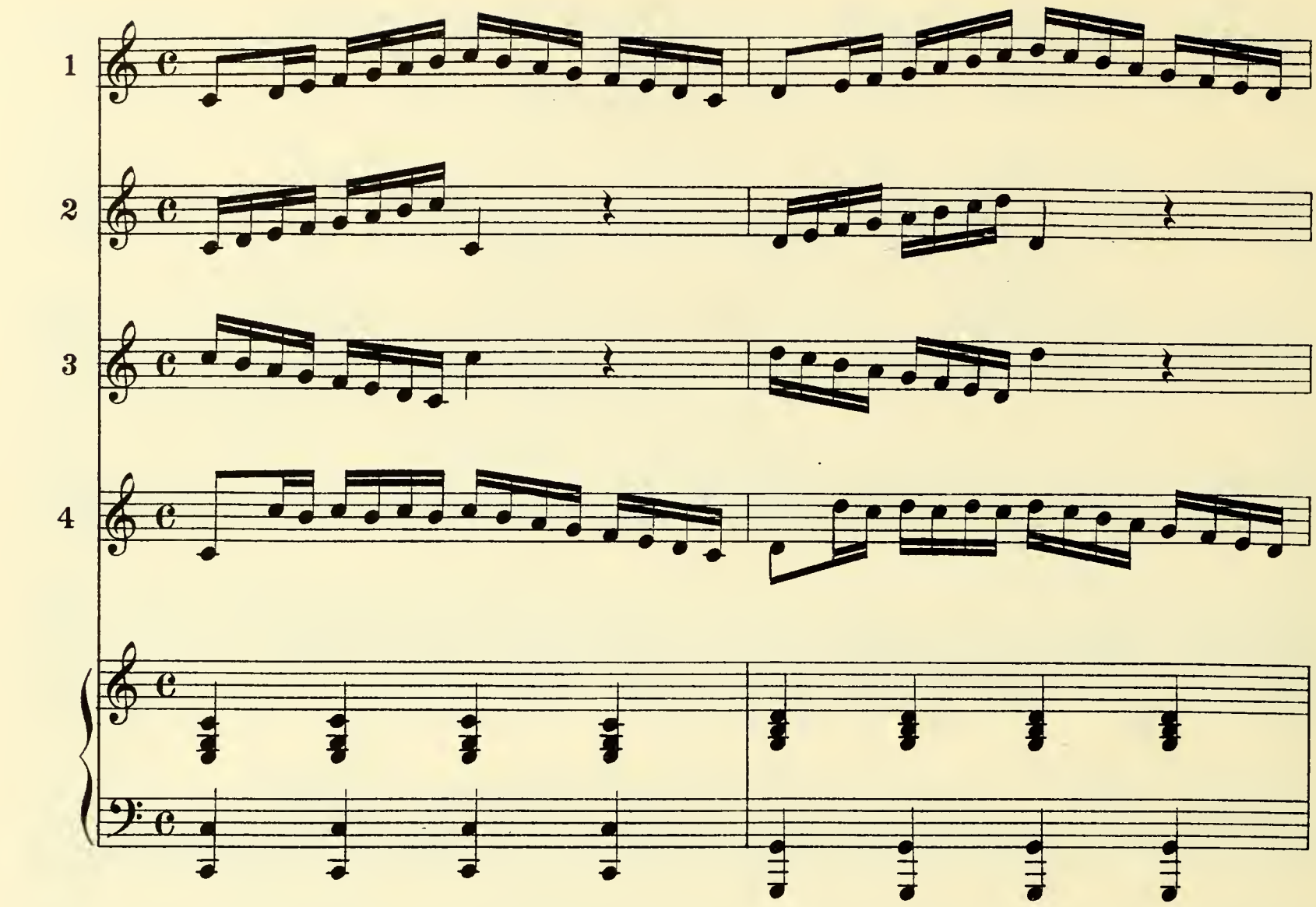
7 *etc.*

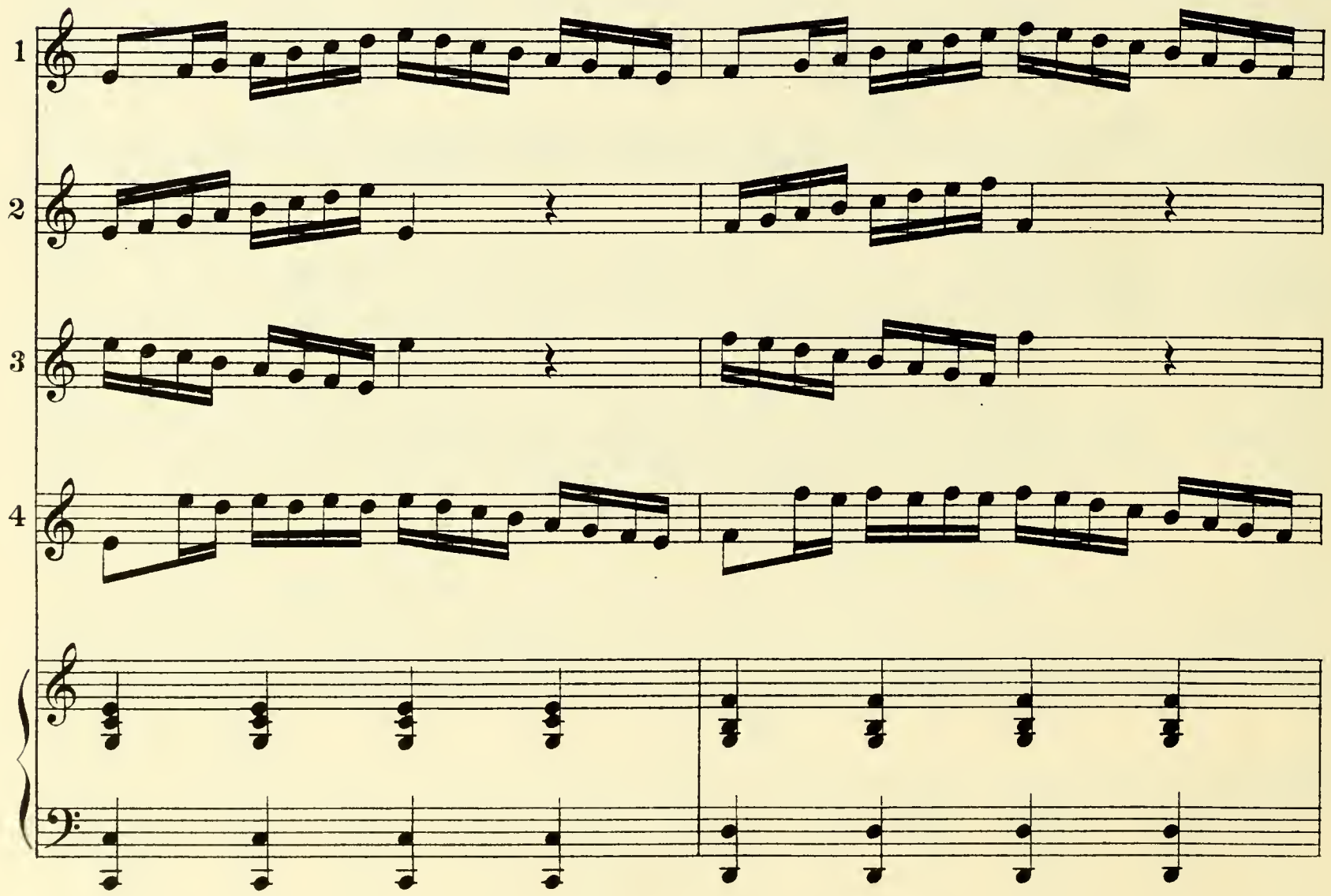
8 *etc.*

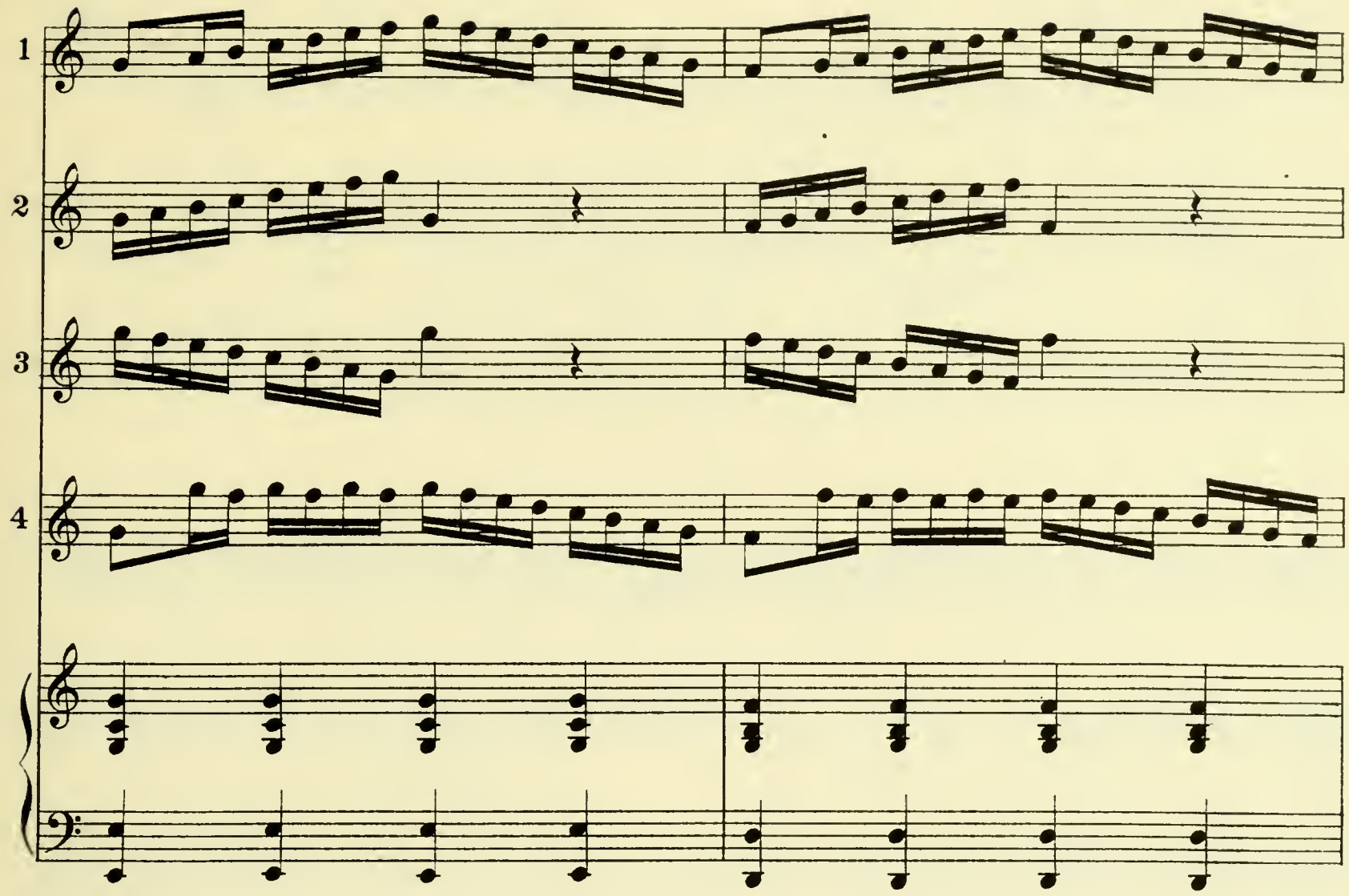
9 *etc.*

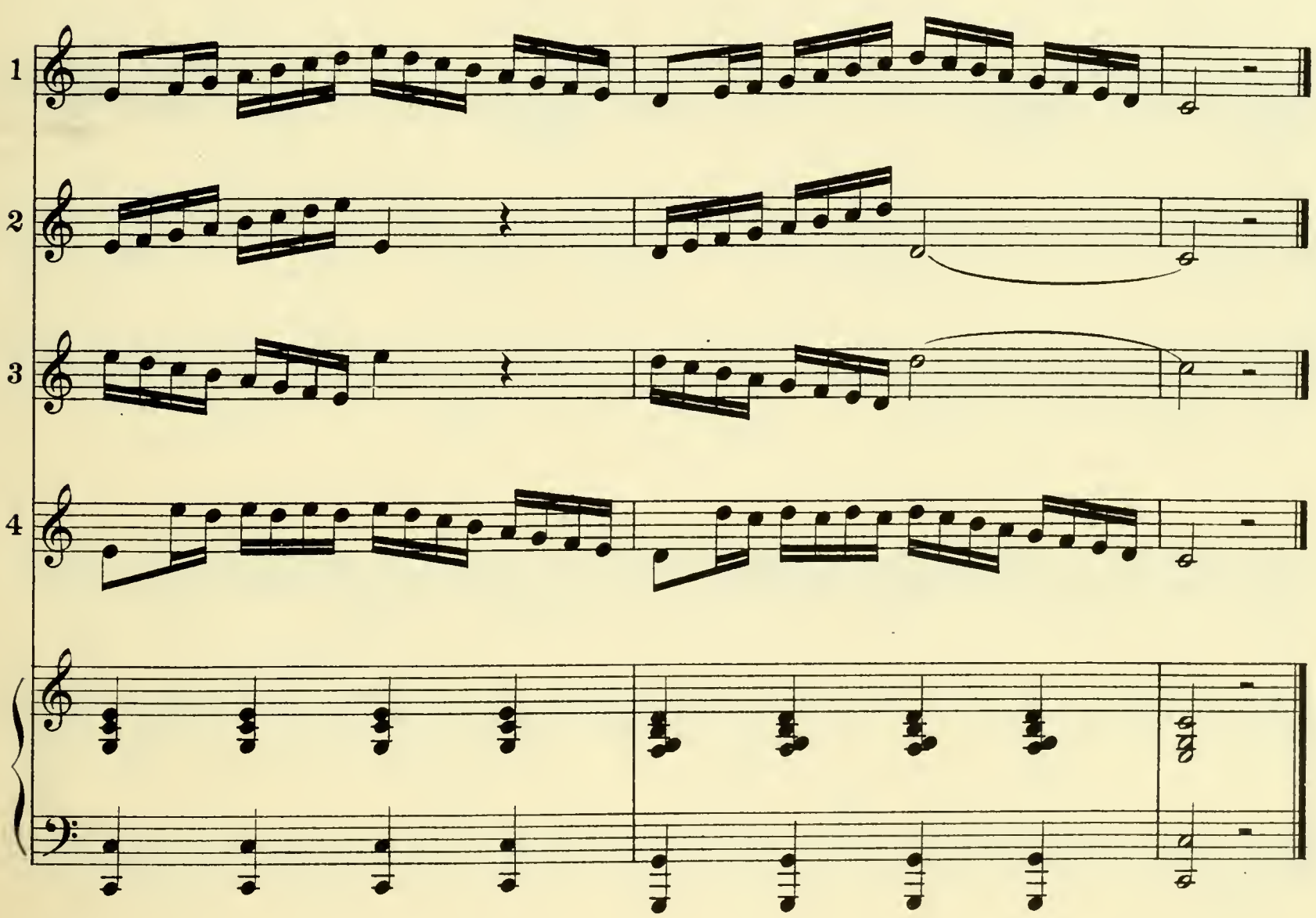
10 *etc.*

etc.


1
2
3
4


1
2
3
4


1
2
3
4


1
2
3
4

Andante.

107.
C.

Andante.

108.
C.

Andante.

109.
C.

f *p*

f *p* *f*

p *f*

Andante con moto.

110.
C.

Sostenuto.

111.
C.

Allegro.

112.
C m.

Allegro vivace.

113.
C.

Allegro.

114.
C.

Andante.

115.
D.

Allegro vivace.

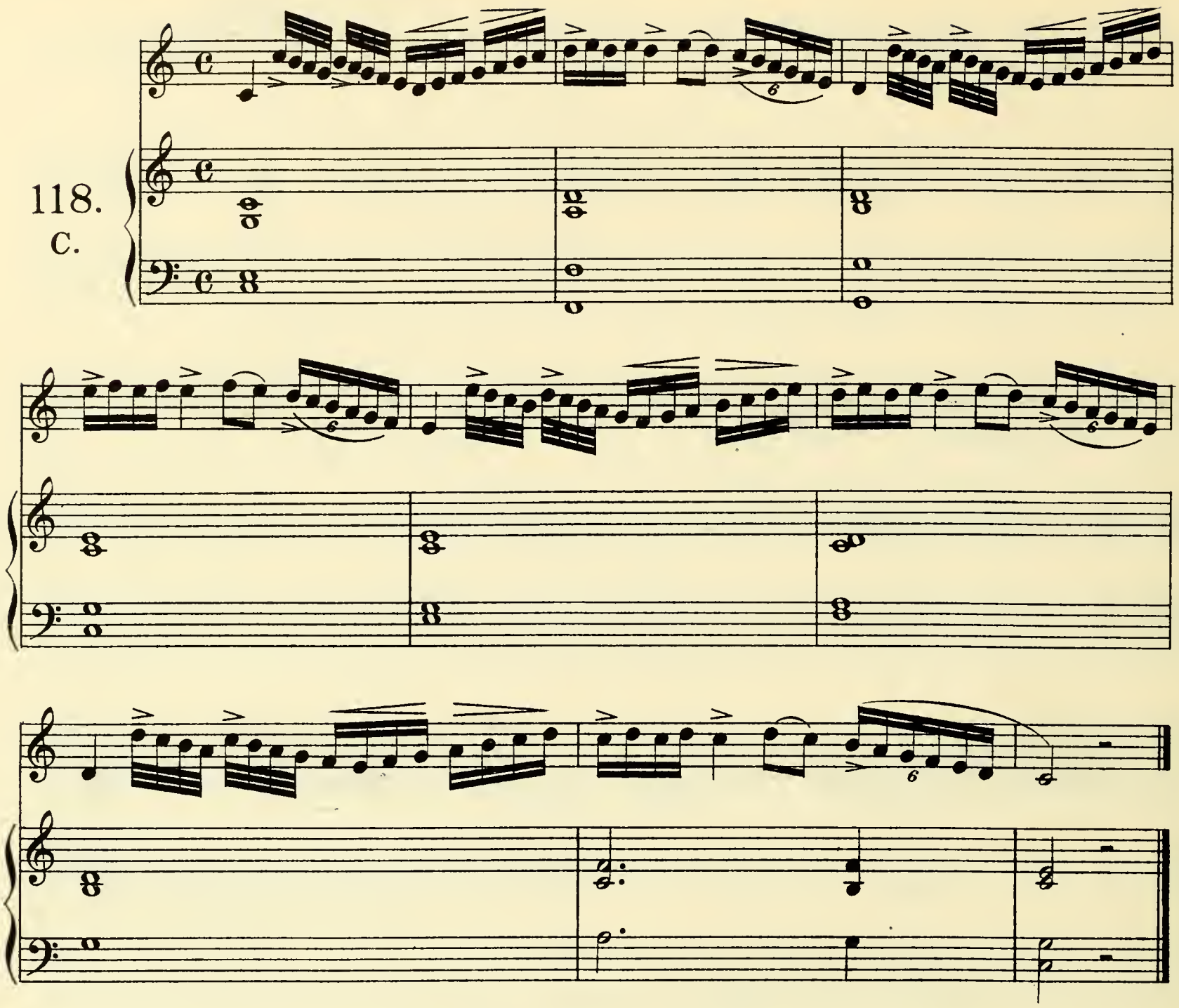
116.
C.

Andante mosso.

117.
C.

Andante sostenuto.

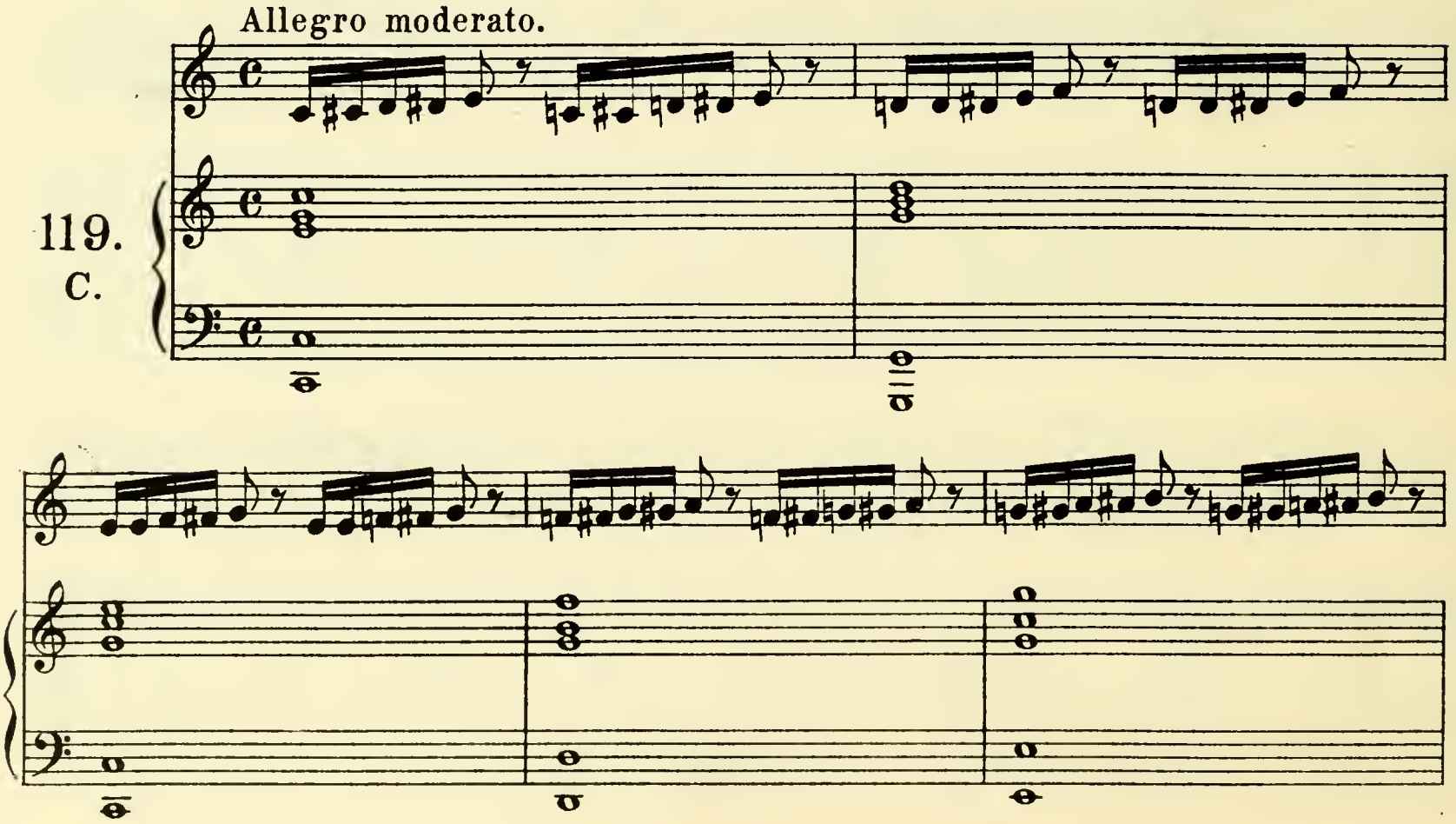
118.
C.

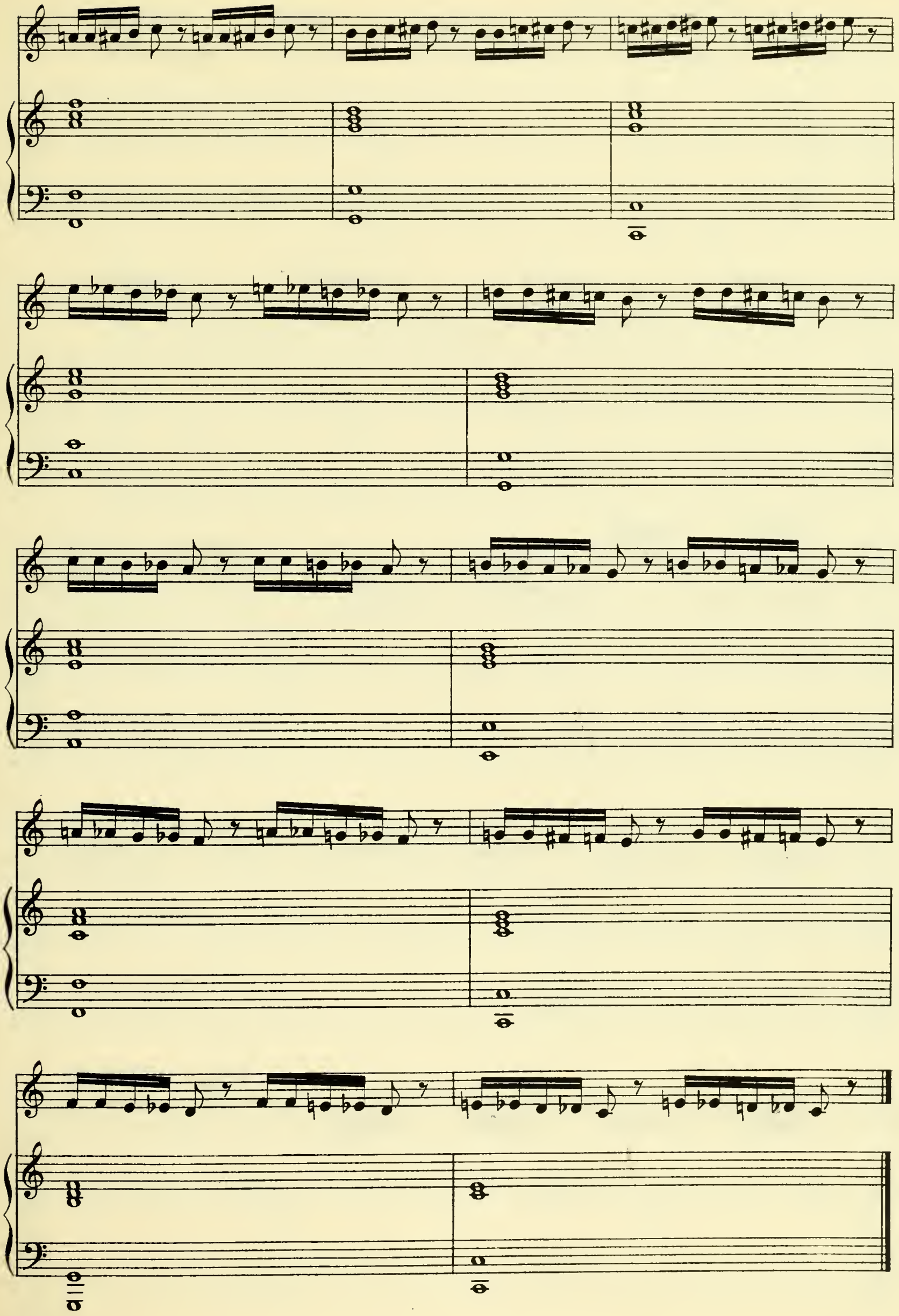


Chromatic Scales.

Allegro moderato.

119.
C.





Allegro moderato.

120.
F.

Allegro moderato.

121.
C.

Allegro moderato.

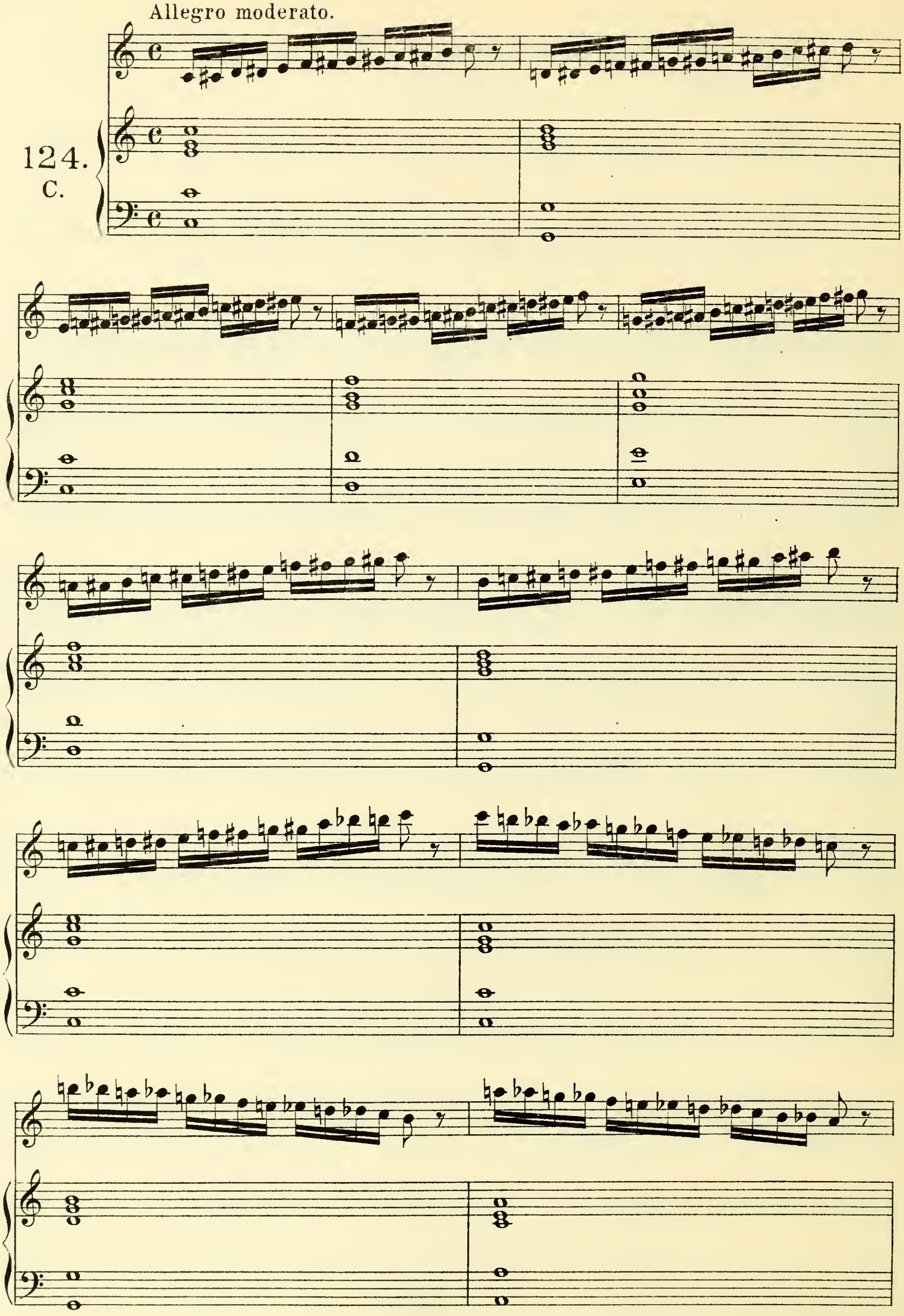
122.
C.

Allegro moderato.

123.
C.

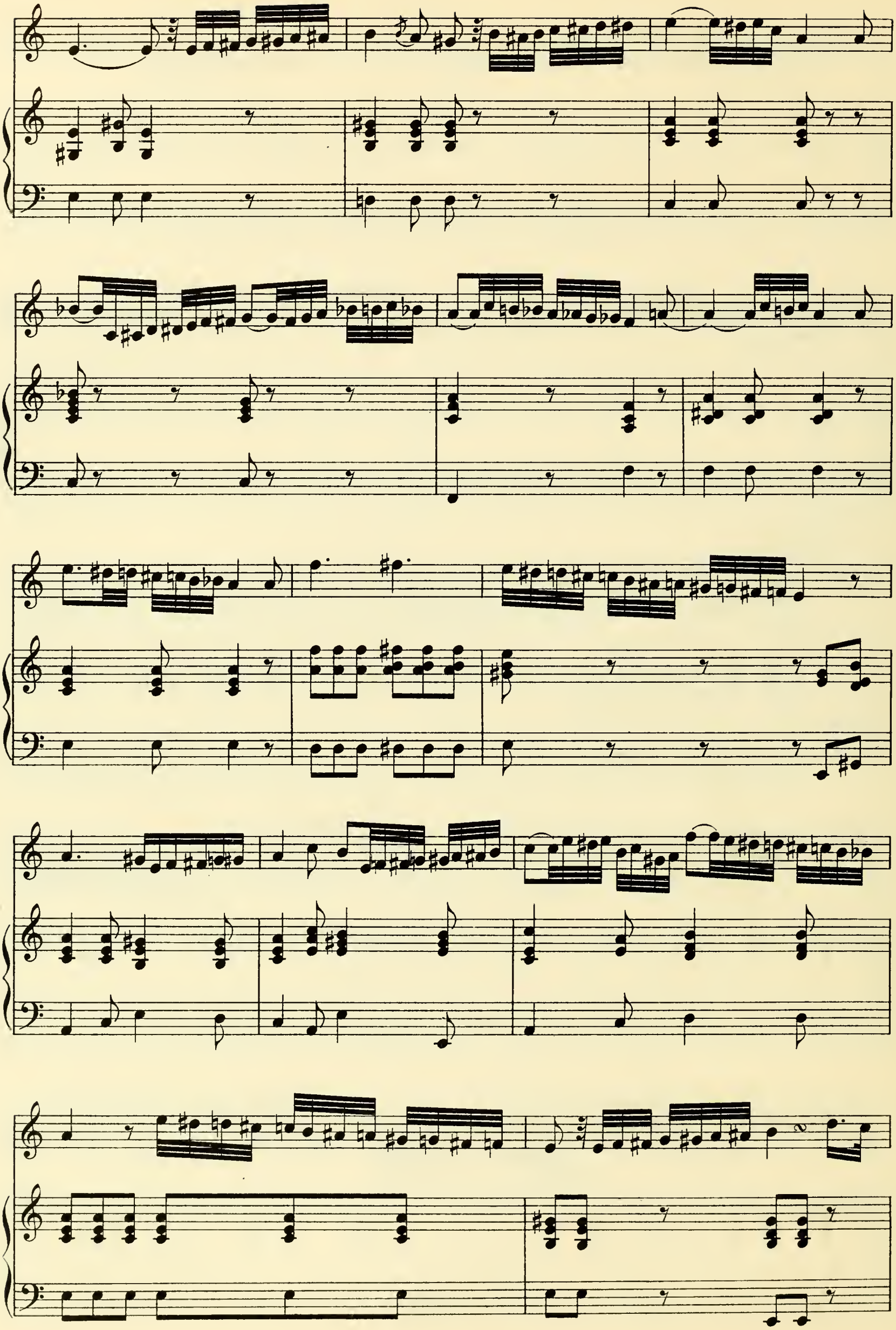
Allegro moderato.

124.
C.



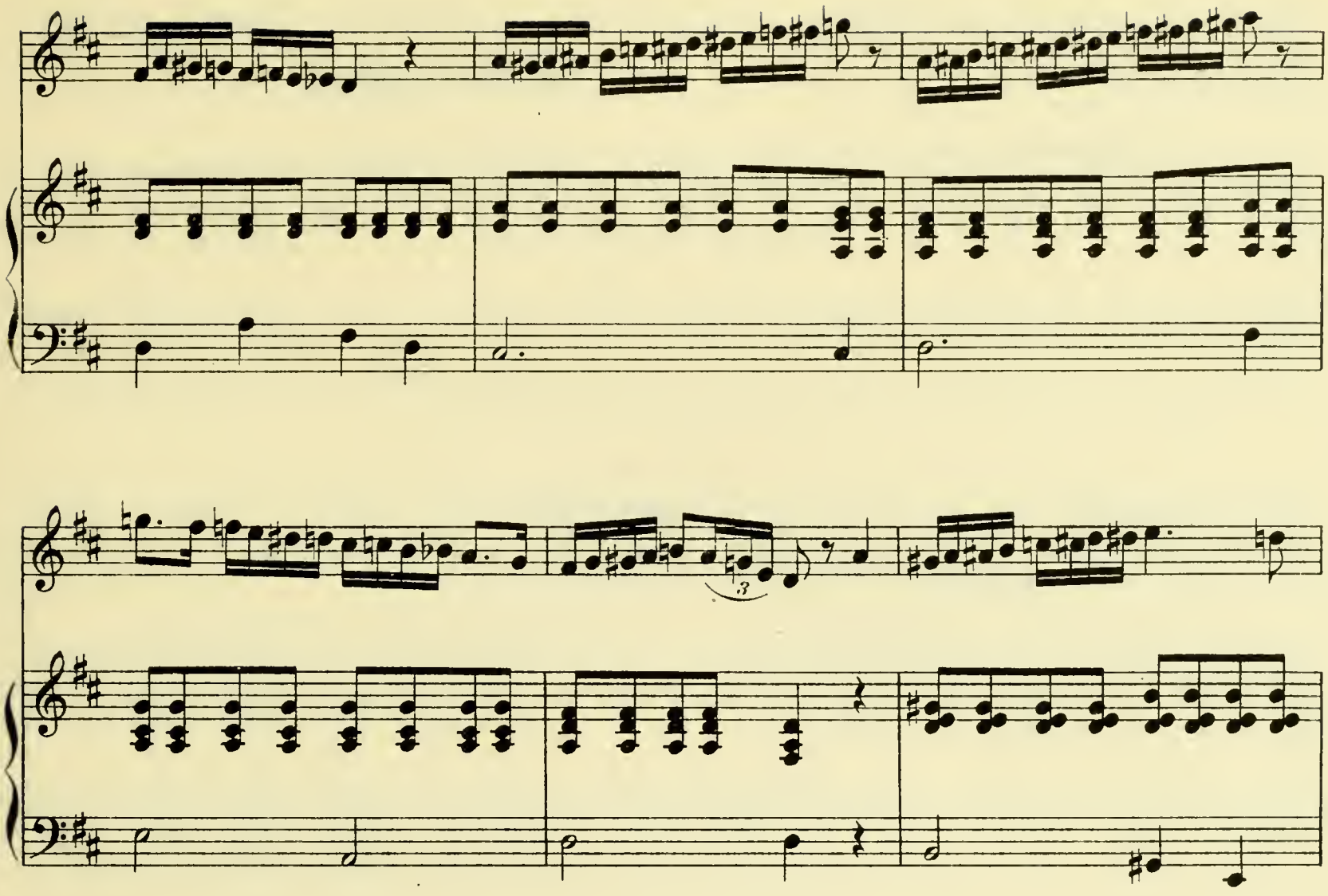
Andante sostenuto.

125.
A m.



Allegro moderato.

126.
D.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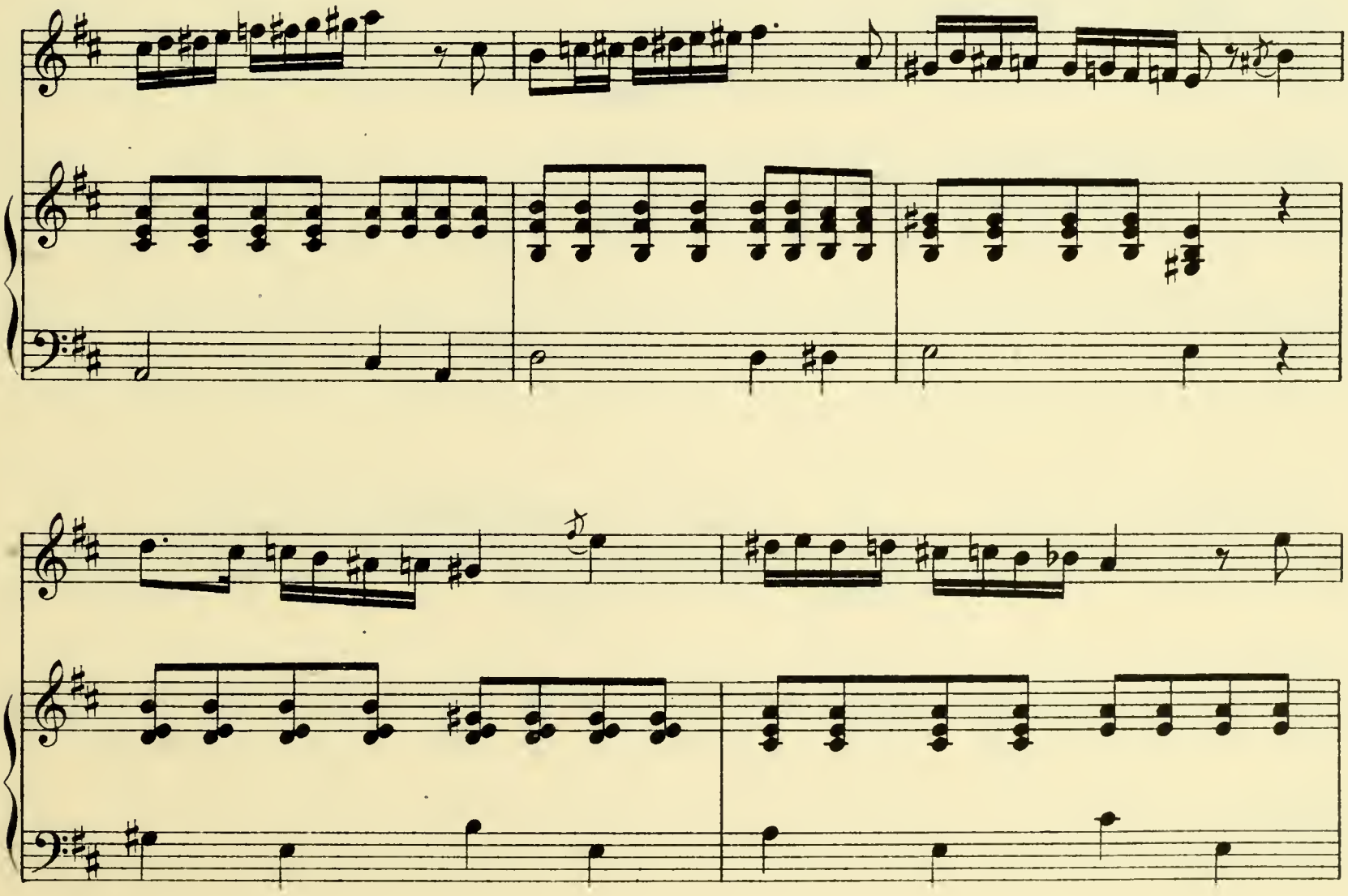
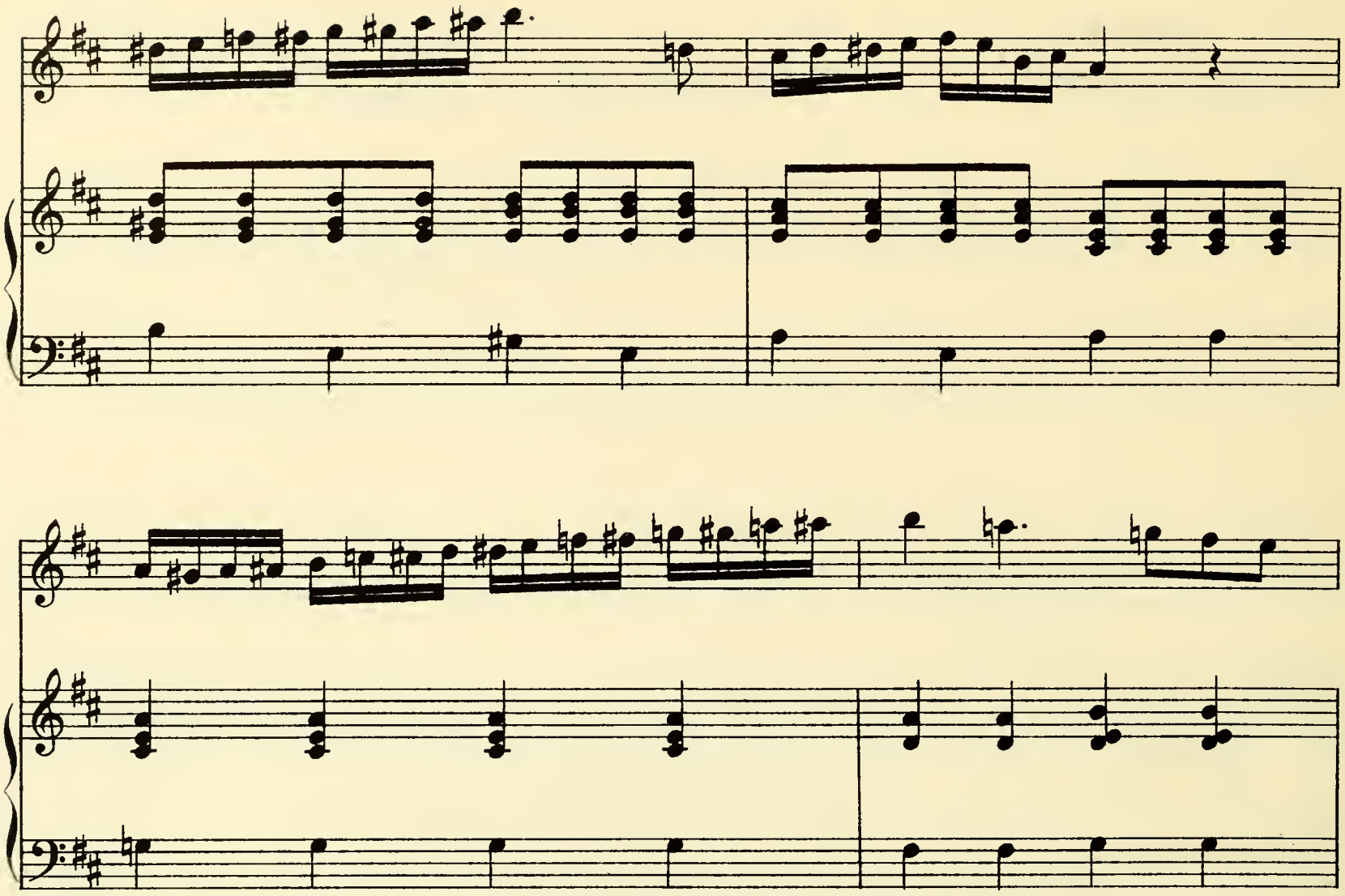
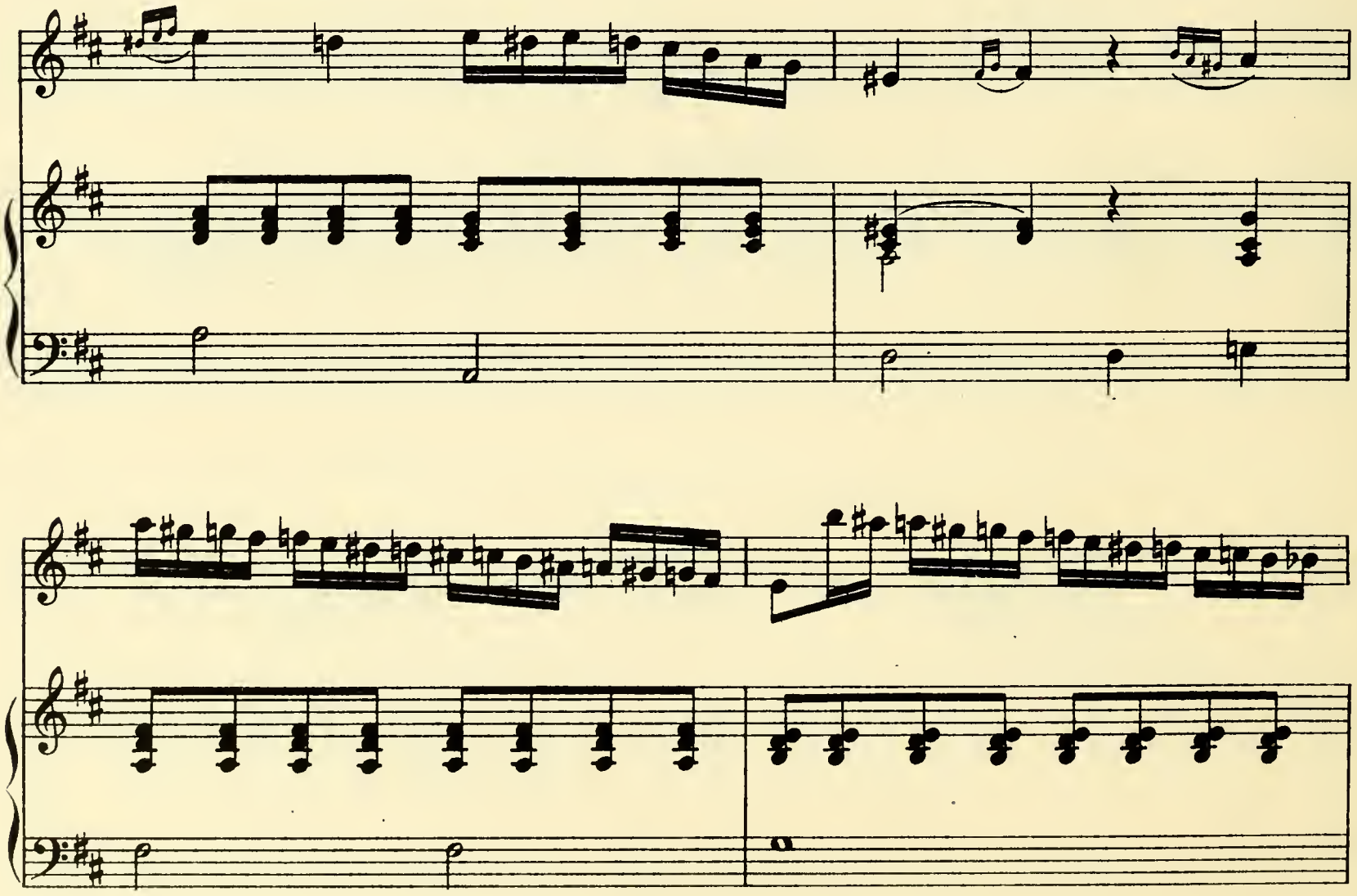






Arpeggios.

For the *Arpeggios* one tone is to be carried on to another without dragging, and almost always with a *decrescendo*. The pupil must give the inflections of the voice all possible flexibility, and moderate accordingly the outflow of the expiration, above all when he wants to take high notes.

127. C.

Andante.

Allegretto.

128.
C.

Andantino.

Andantino.

129.
B♭.

Andantino.

130.
C.

Allegretto.

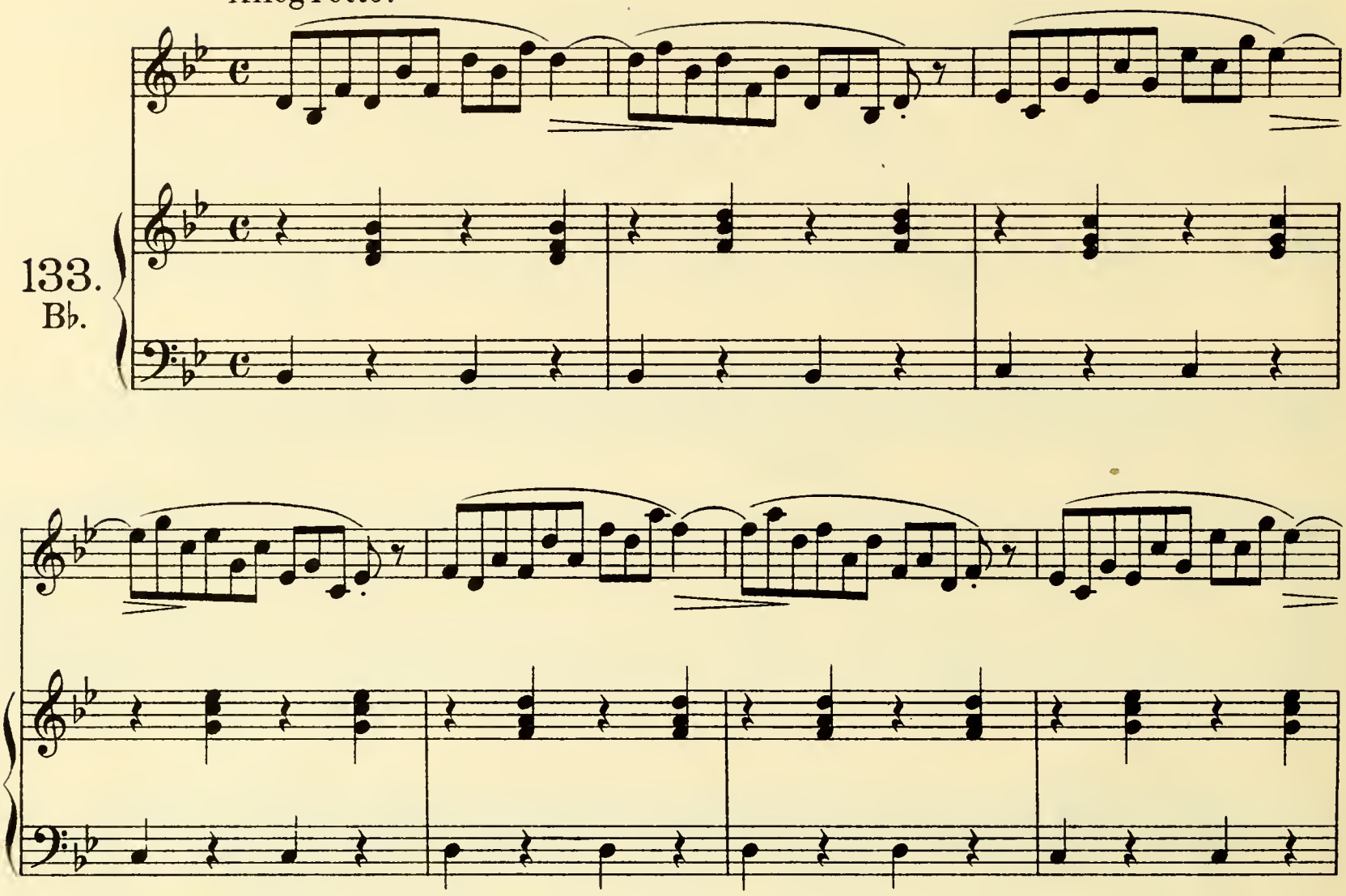
131.
B♭.

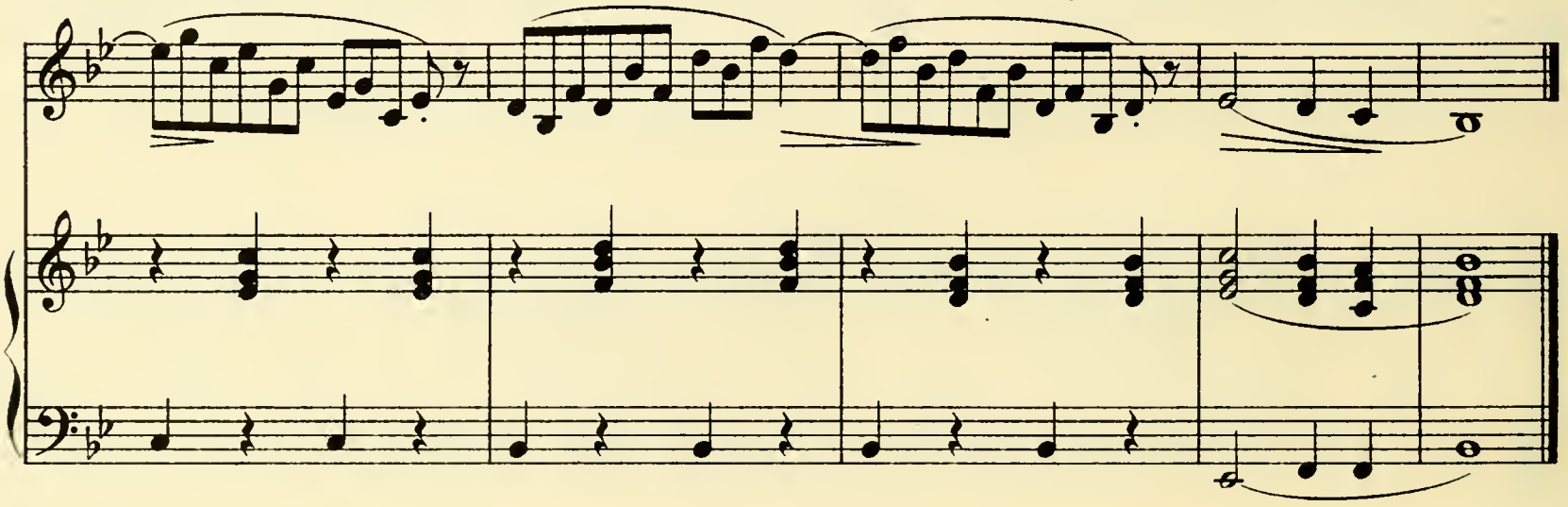
Allegretto.

132.
C.

Allegretto.

133.
B♭.



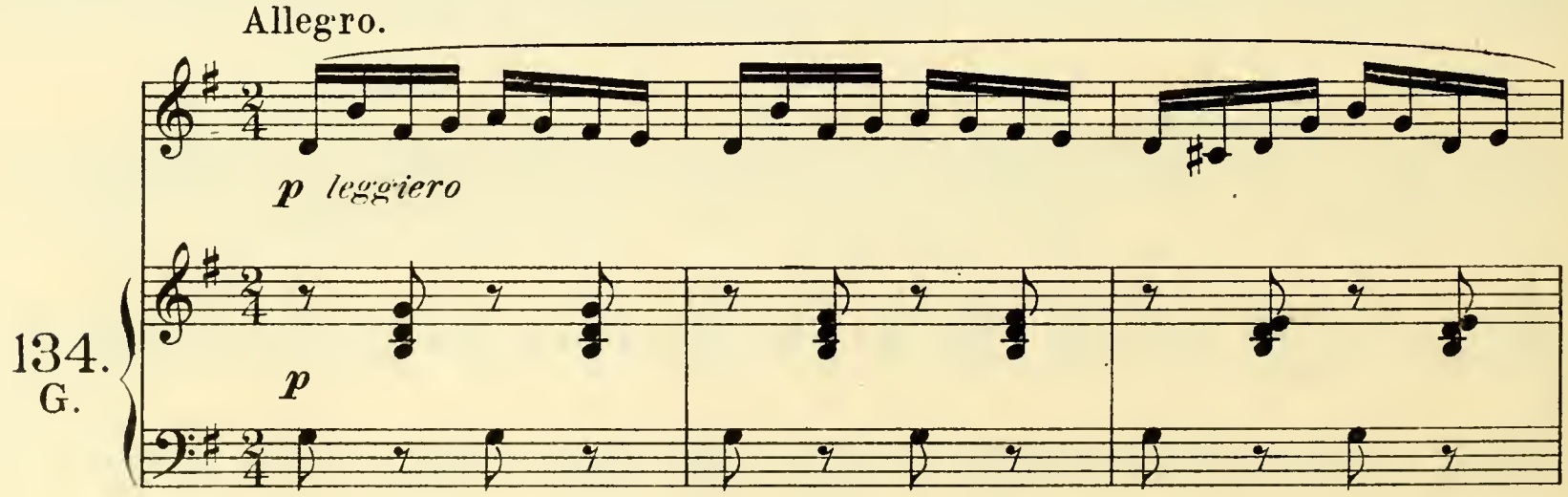


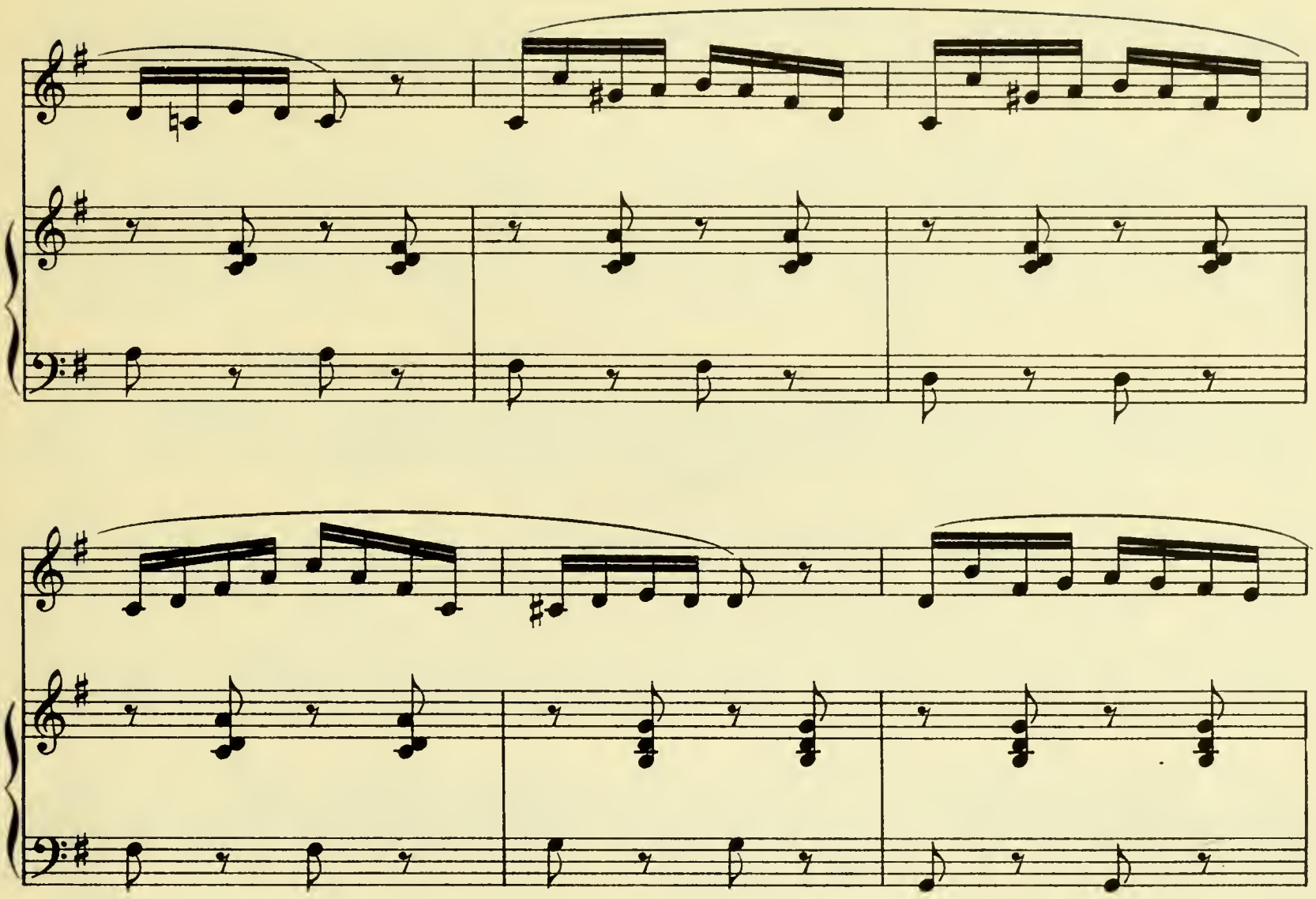
Allegro.

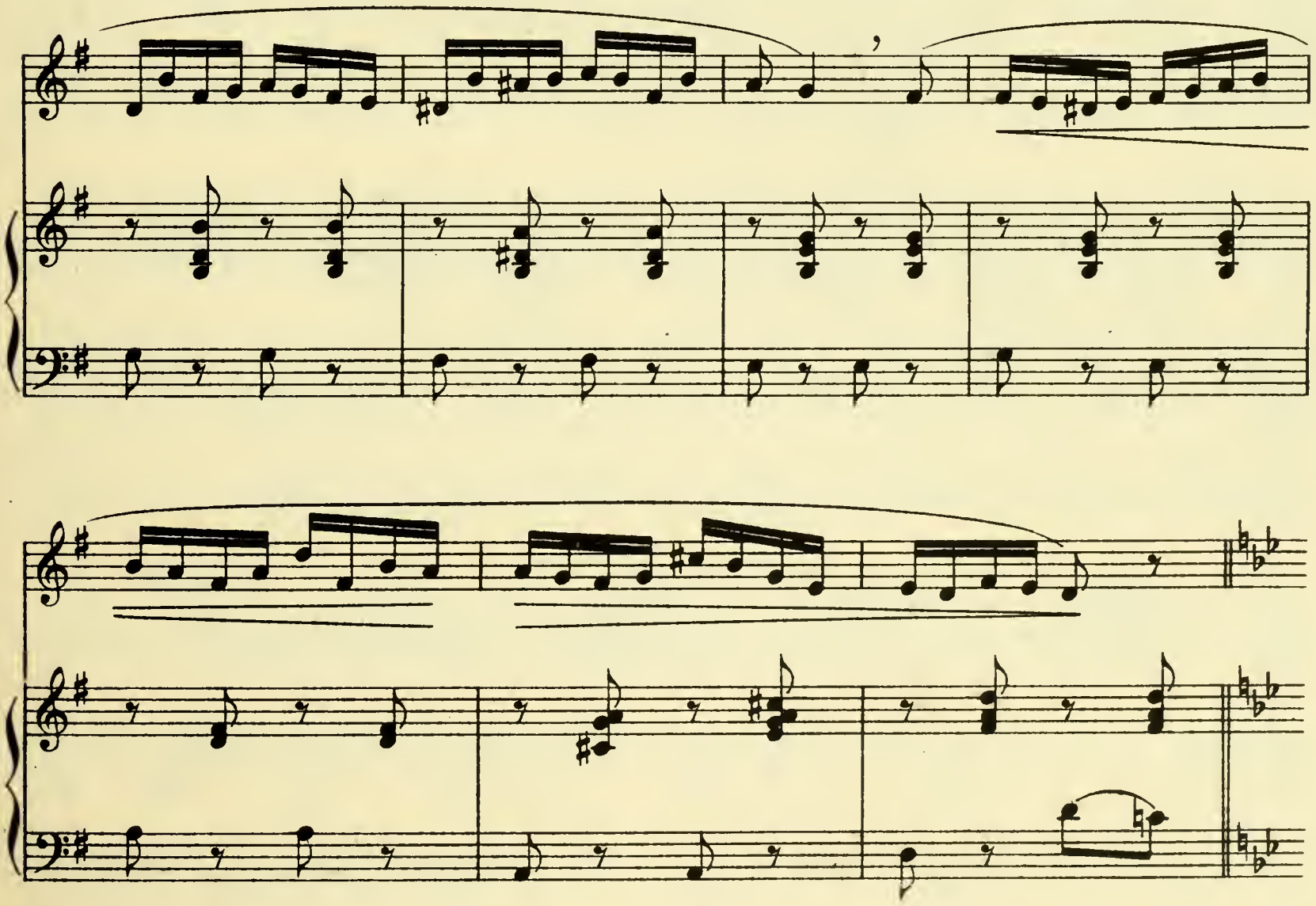
134.
G.

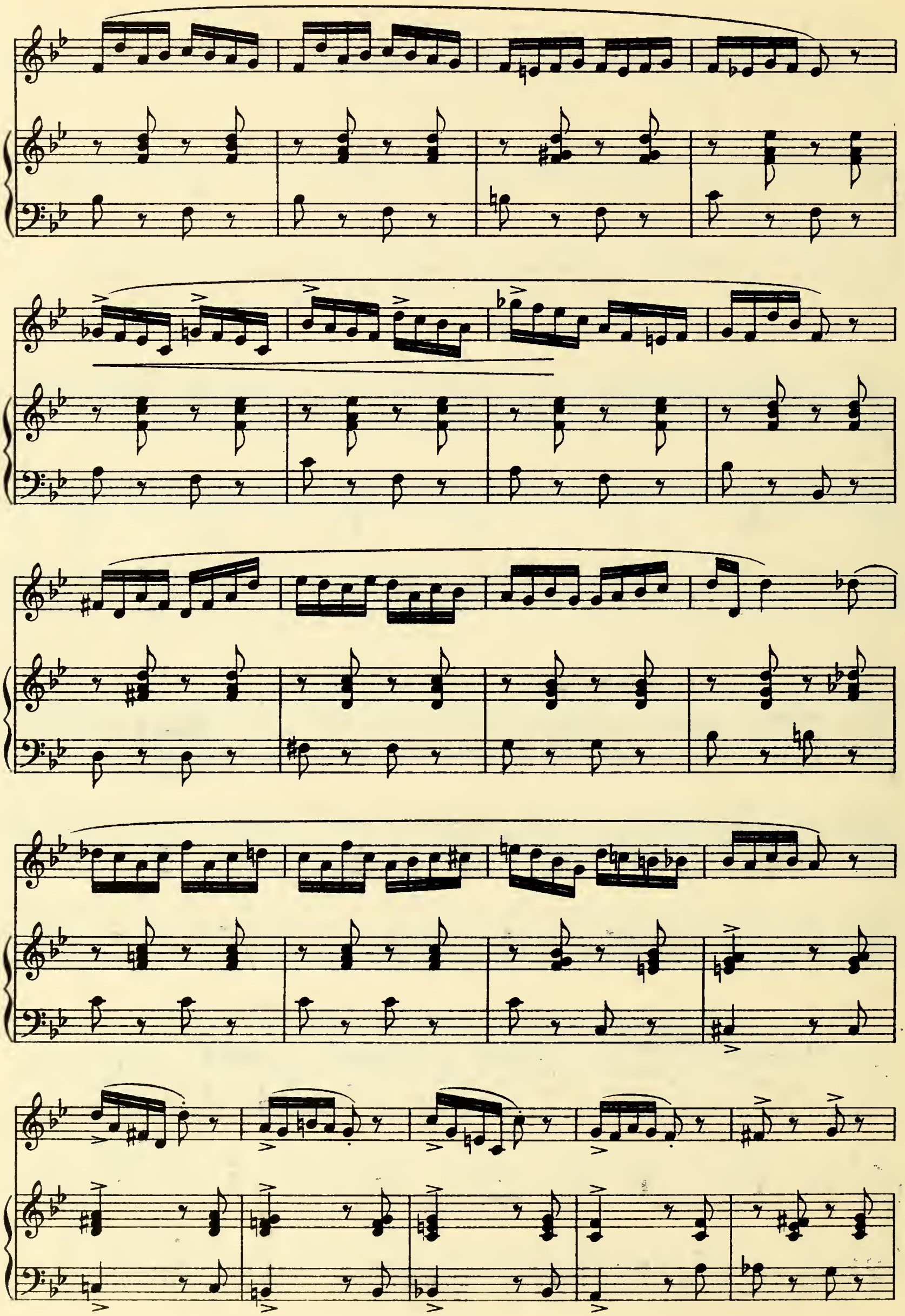
p *leggiero*

p



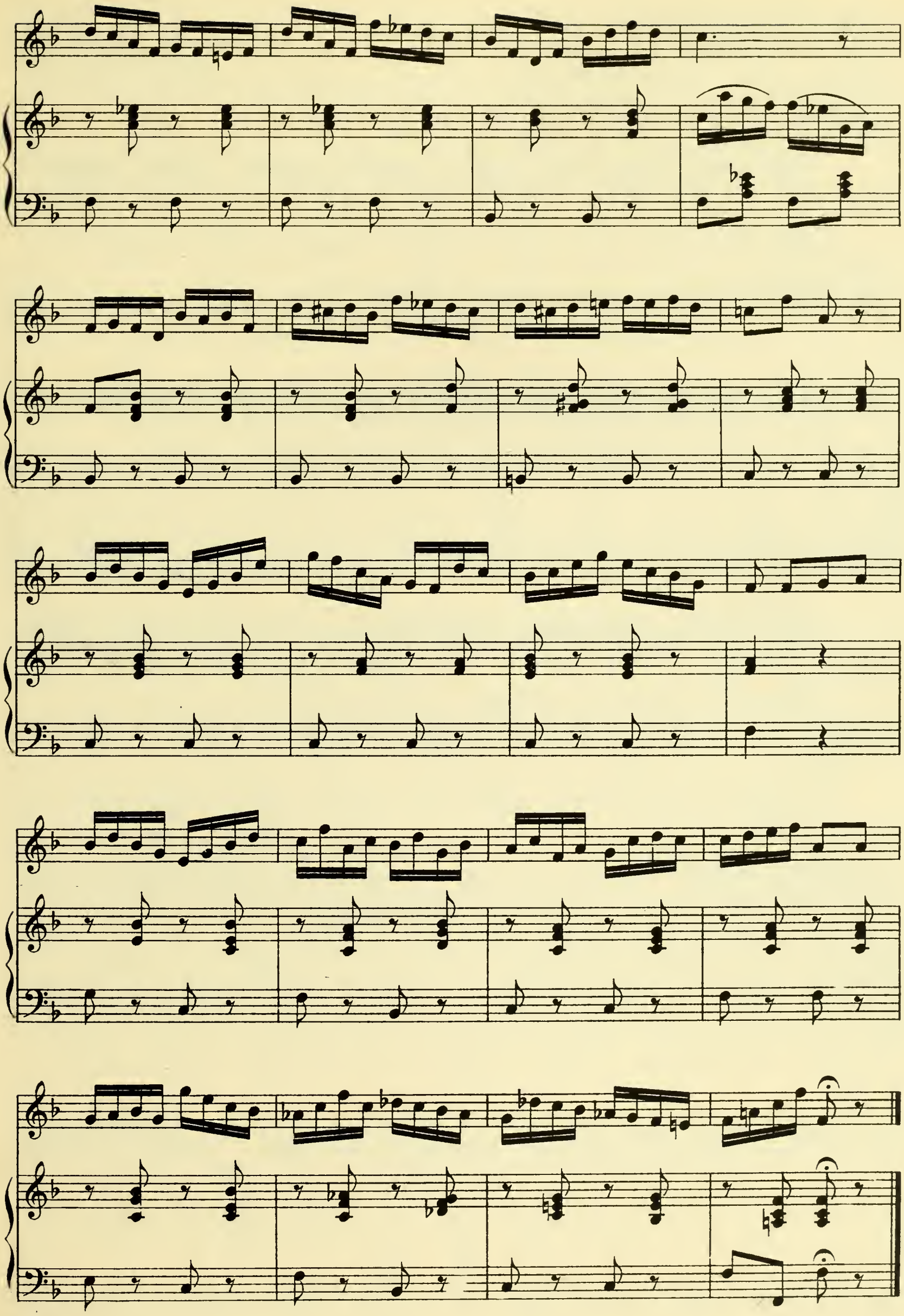






Andantino.

135.
F.

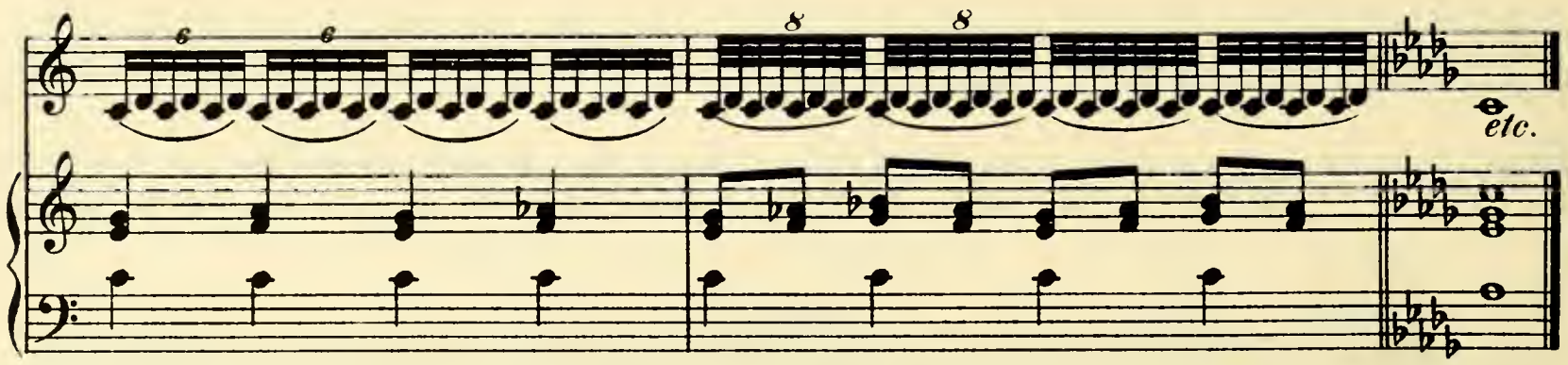


The Trill.

The trill, one of the finest ornaments of singing, may be executed with or without preparation. In the first case, the two tones on which it is sung, begin their movement slowly, and gradually augment their velocity. In the second, the trill must be attacked rapidly, usually beginning on the higher auxiliary, i.e.: the major or minor second above the principal note. The two first exercises given below will train the voice in the prepared trill. The first ought to be transposed by semitones.

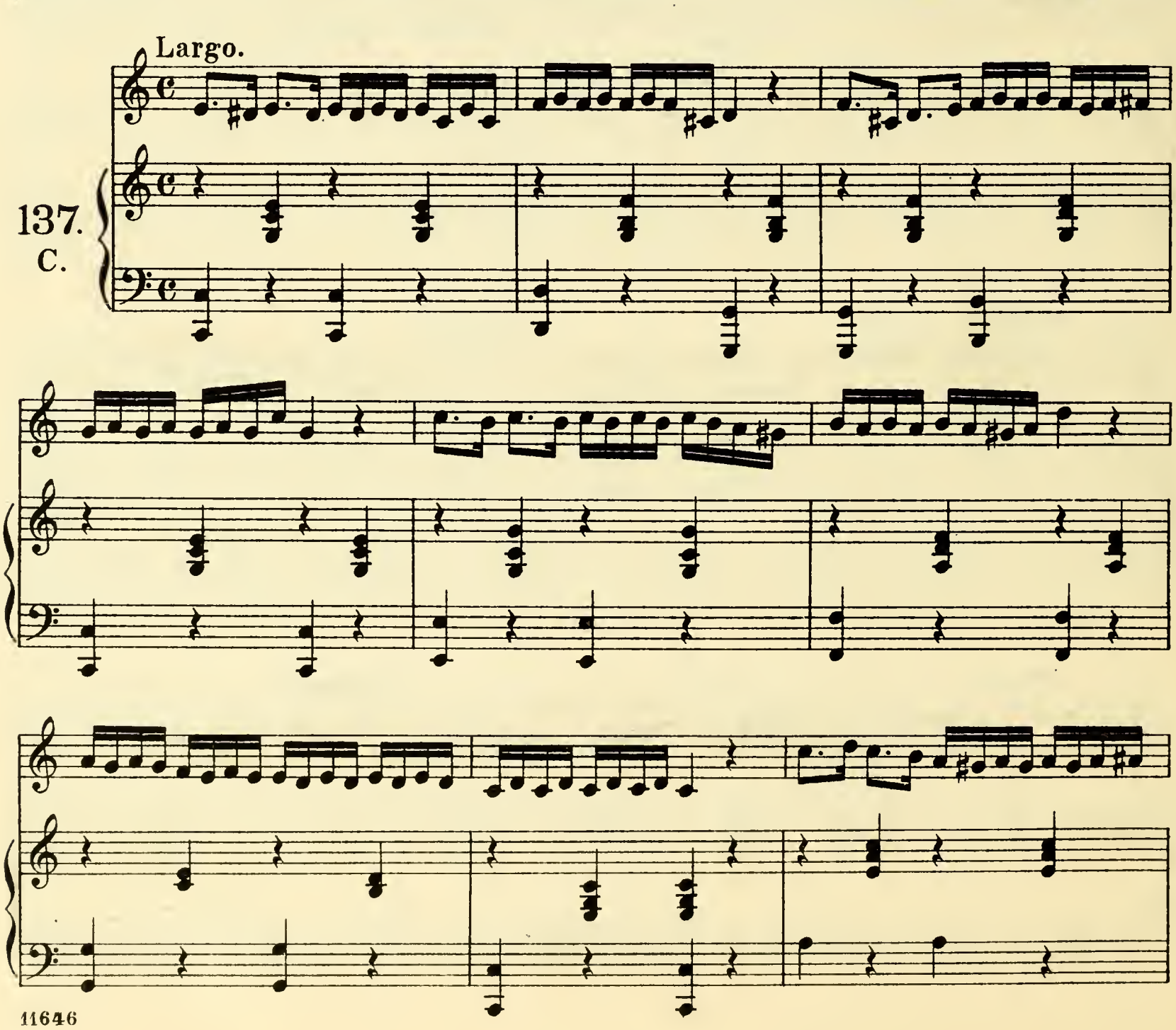
Molto lento.

136.
C.



Largo.

137.
C.



Allegro giusto.

138.
D

Allegro deciso.

139.
A.

p

p

f

f

𝄋

𝄋

>

>

p

p

cresc.

cresc.

Fine.

Fine.

p *cresc.* *p*

f

f

f

f

p

f

p

f

f

Allegro giusto.

140.
F

Larghetto cantabile.

141.
E♭

Adagio.


LABORUM
DULCE
LENIMEN
G. SCHIRMER