

Have you ever wondered why it is harder to sing some pieces in tune than others? And why, when these pieces are raised a semitone, the problem disappears? Flattening seems particularly problematic in F major. Why? At least part of the answer to these questions lies in the relationship between vocal registers and tuning.¹

Admittedly, the subject of vocal registers is a controversial one. Experts do not even agree on how many registers there are, let alone the proper pedagogical approach to take for their development and coordination. Some divide the vocal range into three registers, some into two, and some avoid the term altogether or suggest that trying to understand the vocal range in terms of registers is to take a negative, problem-oriented approach. Thus, for instance, Victor Fields writes, "reference to vocal registers and register breaks should be avoided. The prevention of a 'register break' is more important than its cure."² Nevertheless, since many singers complain of such "breaks" or "changing spots," a realistic approach requires that choral directors recognize their existence and teach singers ways to deal with them.

As for the relationship between register shifts and tuning, a little experimentation with singers who have difficulty making the transition from one register to the next reveals an interesting connection. Invariably, the notes just below the break tend to be underpitched, while the notes just above tend to be sharp. As one might expect, singers with the most abrupt register breaks have the greatest difficulty in tuning these notes.

If numerous singers within a choir struggle with register transition, the effect on overall intonation can be considerable. Furthermore, if the points at which these singers switch registers more or less coincide, certain keys—those whose main structural pitches correspond with these points—will be affected more than others. That choirs frequently have difficulty singing particular keys (such as F major) in tune, is apparently due to such a situation. Before we explore this connection further, however, let us take a closer look at

Choral Flattening: Sometimes it's a Matter of Register Transition

by Mel Unger

the phenomenon of register breaks.

Many young adult singers tend to suffer register breaks more frequently in one area of the vocal range than in any other: the area around e^1 .³ This is generally true of both male and female singers, although some sopranos (those who have not learned to use the heavy register) may not experience a register transition there. Many sopranos frequently report that the E lying one octave above this note (e^2) is a note of transition and therefore difficult to sing. Heavier male voices may "break" before reaching e^1 , while altos who habitually sing with a heavy quality may not shift into the lighter registration until they have reached a^1 . The actual quality of the break varies from singer to singer. Some singers experience only a slight change, others a complete yodel. A few are not conscious of any transition at all.

It is true that not all vocal experts agree with the concept of a universal register break between e^1 and $f\sharp^1$. Thus, for instance, Robinson and Winold suggest that the position of register breaks may be used as a guide for classifying voices.⁴ Others such as Cornelius Reid hold to the model we have proposed.⁵ William Vennard's approach to the subject is similar to Reid's but he is less willing to identify specific break points. He writes,

I prefer not to locate specific notes upon which a voice will change because this tends to make the student self-conscious when he sees these notes in songs. The emotional stimulation of a well-written phrase should carry the singer through without worries such as: That F is my 'changing note.' I know I won't be able to get a good tone on it.⁶

One vocal phenomenon that lends support to our model is that of the male falsettist. Why is it that most falsettists are basses and not tenors? Probably, it is because basses, when singing in their "normal" voices, are seldom required to sing above e^1 , the point we have designated as the beginning of the register change. Thus, they do not need to develop

the technique of bridging the way tenors do and, as a result, have more clearly differentiated registers.⁷ This gives them a purer falsetto sound. One would also assume that they would make better yodellers, for yodelling requires a technique exactly opposite to that of register bridging.

Although most singers think of their break as a fixed point in their range, this transition spot can actually be lowered or raised by changing the volume of the tone.⁸ The louder a vocalist sings, the higher the break moves. Occasionally directors will encounter singers who claim they can reach high notes only if they sing them loudly. This should be an immediate warning to the conductor for it means that such singers habitually avoid "crossing the break" in favor of forcing the heavy register up. Any singer who thinks high notes are conquered in this way will prove to be a chronic "flatter," a source of never-ending grief to the director concerned with tuning and blend.

Conversely, the softer a vocalist sings, the lower the breaking point moves. This is especially so if the singer relaxes the voice completely; such a relaxed condition can usually be achieved by encouraging the tone to become breathy. Thus, if a singer descends from the top of his or her range using the light register mechanism and maintains this quality as far as possible by allowing the tone to become ever softer in volume and more "hooty" in quality, the vocal mechanism will not switch into the heavy register until well below the usual breaking point.

To determine the distance between these two potential transition points for any given singer is not difficult. The lowest possible break point may be located by singing down the scale in the light register as far as possible, allowing the tone to become softer and more breathy with each step. The highest possible break point may be determined by moving the heavy register gradually upwards, forcing the tone to become louder and brighter with each step.

Such forcing is potentially harmful to the voice but should not be dangerous if attempted only a few times for the purposes of this experiment. With coaching, most singers can draw the break down or force it up until an octave separates the highest and lowest points. Since any note within this octave may be sung in either register—at this point we make no judgement about the tone quality required to demonstrate this possibility—we will refer to this octave as the octave of overlap. (Figure 1)

The techniques we have just used to locate the outer limits of register

Female Voice

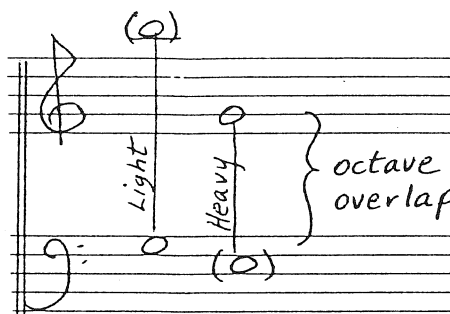
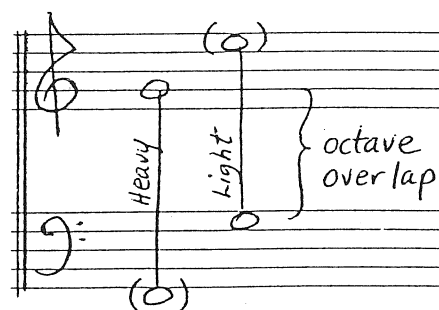


Figure 1.

transition are, in fact, antithetical to proper vocal production. For the purpose of our experiment it was

Male Voice



necessary to resist the register transition by "gripping" or locking the vocal muscles. This action aggravates the problem of "breaking" and, in our opinion, should not be practiced regularly. About this matter, too, however, one can find dissenting opinion as in this passage by Cornelius Reid:

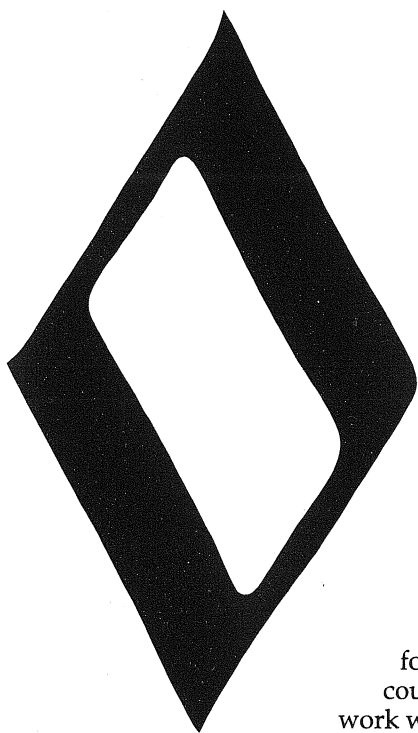
Once the registers have been separated the next step is to promote, by means of appropriate exercises, those quality characteristics natural to each register. The 'robust' chest register coming from the 'breast by strength' must be built up until the normal power level of the individual voice has been reached, after which this solidity must forever be maintained. The falsetto, too, must be strengthened and brought to a comparable intensity level with the chest register. After these conditions have been satisfied, then the registers are ready to be brought together and made to work as a single, co-ordinate unit.⁹

William Vennard calls such locking of the vocal muscles a static balance:

If any muscle tightens so rigidly, or if any cartilage becomes so braced, that a new adjustment is impossible without "breaking" the tone that is being produced, I shall call it static balance. Such a condition can be recognized, even though our anatomical knowledge is not precise enough to define the rigidity specifically.¹⁰

A static or locked muscular adjustment is particularly evident (and potentially harmful) when a singer forces the heavy register upwards.¹¹ As the voice climbs even higher, the tension increases until the singer reaches a critical point where he or she can no longer sustain it. At that point the muscles release and the voice flips into the light register. It is not our intent here to describe the physiological intricacies of this change. Such descriptions, complete

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with stopped-action photographs are available elsewhere and have only limited value for singers, who rely on their physical sensations to guide them.¹²

Even singers whose tone production does not reveal an actual break often resist the transition to some degree when moving upwards in the heavy register. This can be heard in their tone quality, which becomes increasingly pinched as they approach the critical point. In effect, such singers remain too long in the heavy register before beginning the process of transition.

The correct procedure for making the register transition is to make it gradually; to begin to introduce the muscular action of the new register early in the octave of overlap and then to transfer the workload gradually to this new set of muscles. If done gradually enough, the vocal timbre is never disturbed. That is not to say that the timbre does not change. On the contrary, it is the very attempt to produce an unchanging timbre that will cause the voice to "break." Rather, the timbre changes so gradually that the change is unobtrusive. Directors may variously call this "lightening up" (when moving up into the light register), "bridging the registers," "mixing the registers," etc.

To teach singers how to accomplish gradual register transition, we must first convince them that both registers are useful and that they will never achieve a pleasing timbre throughout their range if they choose one or the other of the registers as the "right" one. More specifically, we must teach them to spread the transition over the entire octave of overlap. This means finding a "half-way" vocal adjustment that feels like neither register, and yet like both of them; a dynamic adjustment that allows the heavy and light registers to be mixed in changing proportions until the transition is completed.¹³ The diagram in Figure 2 illustrates the concept.

The physical sensations involved in the process of register transition are related to that sphere of vocal

pedagogy often called "tone placement." We have all heard the axiom "high tones must ring in the head." Other, similar, instructions include,

Figure 2.

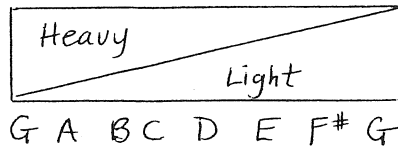
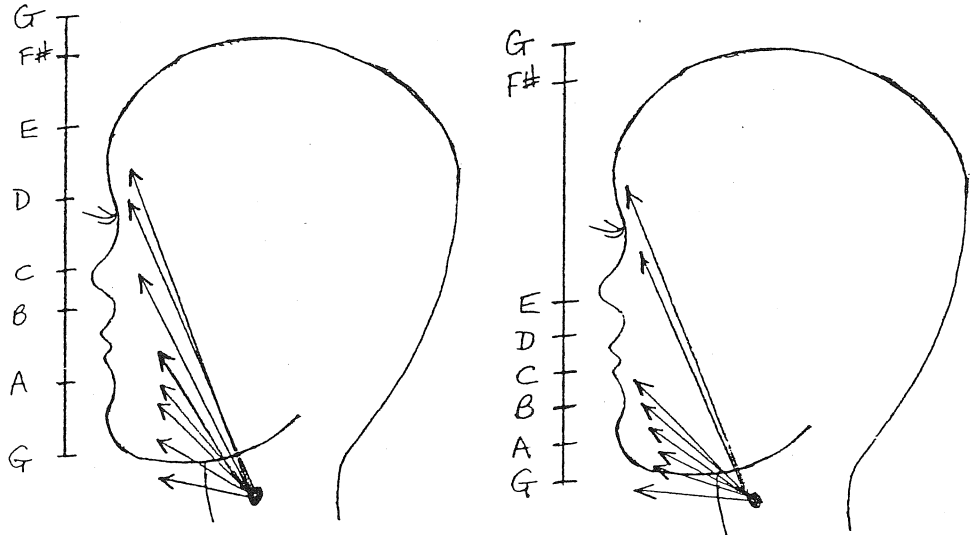


Figure 3.



Singer making gradual transition

Singer with a register break

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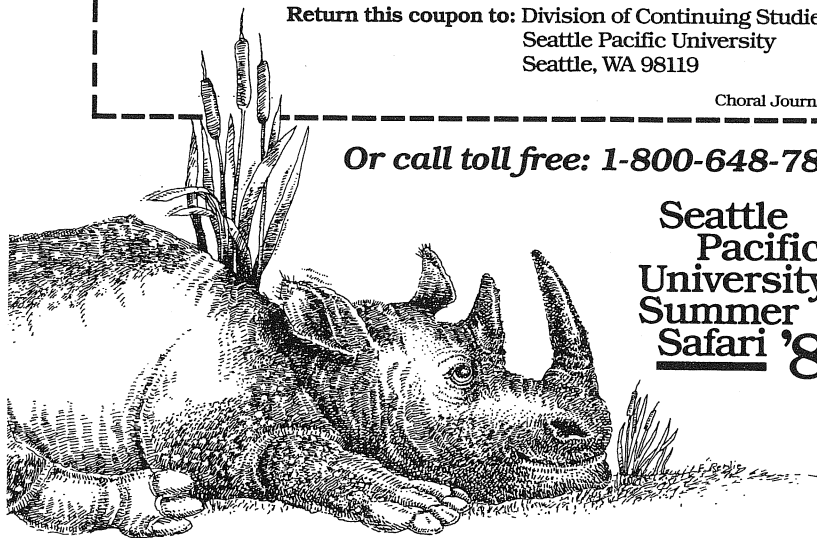
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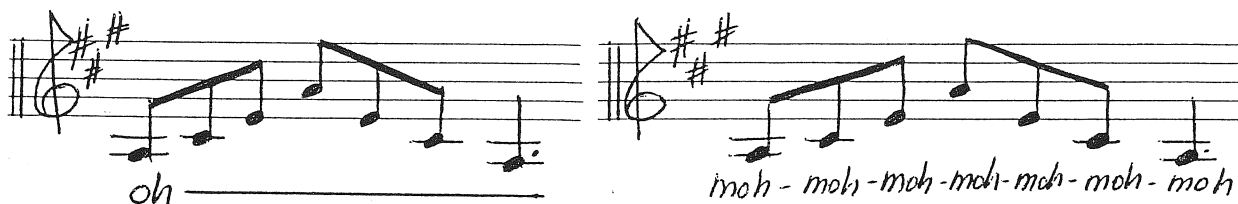
tween head and throat locations and is never "in the mask." The contrast between the two types of sensations is illustrated in Figure 3.

Singers with severe register breaks may find it hard to believe that they will ever be able to make such a gradual transition. For such persons the procedure we described for demonstrating the octave of overlap (in their case it may actually be less than an octave) is helpful. Even if the span is considerably less than an octave, it is important for them to experience the sensations of singing the notes within this span either way: with the heavy adjustment or with the light adjustment. They are then ready to begin building a technique of register bridging.

There are two basic types of exercises for register bridging. These correspond with the two factors that affect register transition: loudness and pitch. This relationship suggests the two classes of exercises that a singer may use to practice bridging the registers: 1) exercises that move from high to low and back, and 2) exercises that move from soft to loud and back.

Generally, vocal authorities acknowledge that no harm can come to a voice by drawing the light register downward, but that considerable harm may result from forcing the heavy register upwards.¹⁴ For this reason both types of exercise begin in the light register, change to the heavy register, then move back again. Another reason for beginning with the light mechanism is that, for many singers, this is the unused register. Male singers usually avoid the falsetto, as do young female singers who have learned to imitate the "chest voice" of many popular vocalists. In rare instances, one encounters female singers who avoid the heavy register. They usually have low notes that sound weak and artificial (somewhat like a man's pure falsetto when singing in the same range). For such persons, it may be necessary to reverse the above procedure and begin in the heavy register. Thus, the first set of exercises would move from low to high and back, the second set from loud to soft and back. Once singers can reproduce the sensations of a dynamic — rather than static — muscular adjustment, it is permissible to practice these exercises beginning in either register.

Figure 4.



Of course, to be effective, both exercise types must be practiced within a suitable range. More specifically, this means that at least some part of the vocalize must lie within the octave of overlap.

So far we have spoken about general types of exercises. The number of specific exercises one might invent within each category is limited only by one's ingenuity. Of the first type of exercise, a glissando is particularly effective. Initially, the glissando should start from the top, high enough to ensure that the voice begins completely in the light register. Arpeggios are also good but must be sung without the small "h's" that frequently creep in as the student aspirates each note. The use (even if it be unconscious) of such "h's" is a vocal crutch. It allows the vocalist to take the voice "out of gear" while readjusting the muscles. A glissando, on the other hand, forces the singer to make this adjustment while phonating.

Of the second type of exercise, the simplest is a crescendo on a single note within the octave of overlap. Beginning in the light register, the singer makes a crescendo that gradually engages the muscles associated with the heavy register. This is the "messa di voce" of the old Italian masters.¹⁵ It is invariably harder to accomplish than the glissando, and singers with obvious breaks will not be able to execute it smoothly until they have perfected the glissando.

The most difficult point in the transition is the mid-way point. Here the voice is tugged in both directions. To help singers find a mixture that is half-way between the two registers and, hence, to achieve that tone-placement described as "placing the tone in the mask," exercises on "m," "n," and "ng" are helpful. Because these are the only three sounds in the English language that force all the air through the nasal chambers, they are generally used for building nasal resonance. That they also have a bearing on the severity of the break can be demonstrated by asking a

singer to sing two arpeggios across the break, the first on a sustained vowel (but without "h's"), the second on the same vowel but beginning each syllable with "m," "n," or "ng." (Figure 4)

Almost invariably, the singer will "break" less on the second exercise. By trying to reproduce the tonal placement of this second exercise (e.g., by imagining the "m"), singers can learn to sing the first one without the abrupt register change.

Now let us return to the relationship between register transition and a choir's tendency to sing under pitch in particular tonalities. In keys where singers are continually required to "nudge" up to points of transition, they tend to "turn the screw one turn tighter" rather than change registers. This is particularly true of singers for whom register transition is an "all or nothing" proposition. It is also more

common in pieces where the individual voice lines approach the break area by a series of ascending steps rather than by leap. Given the right set of circumstances, however, even the most determined singer gives up attempts to sing these high notes in the heavy register. Such a situation is created when a piece of music is written high enough to force singers to switch registers, or when its highest notes are consistently approached by leap.

As we have already noted, for many singers the critical point—when singing at a moderate dynamic level—lies between e^1 and $f\#^1$. This may explain why untrained voices frequently cannot maintain their pitch when singing in the key of F. The fact that sopranos often identify a troublesome transition one octave above this only aggravates the problem. If such a piece is raised

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from F to F#, the choir's ability to stay on pitch usually improves dramatically.

Whether or not one accepts the idea that the register break falls at the same point for all singers, choral conductors must help their singers accept the light register as a legitimate one if they wish to solve the problem of chronic flatting. This does not mean that tenors must sing their high notes in a pure falsetto. It does mean, however, that they must learn to "lighten up" or begin "approaching falsetto" as they move higher in their range.¹⁶ Females, too, (especially those who have learned to emulate "pop" singers) must learn to release the "cheer-leading" quality of the heavy register as they move up in range.

Not only must singers avoid increasing the volume on their high notes in an attempt to keep the voice from breaking, but they must also give up the notion that tonal intensity and resonance are to be achieved at any cost. Tonal freedom is always preferable to tonal clarity. The hard, pinched, tone quality that frequently characterizes the singer troubled by register breaks is the outward sign of a static muscular adjustment. This

static adjustment prevents the singer from changing the "placement" of the tone and subsequently causes the voice to break. If singers learn to value a free tone over an intense one, they will find that, with judicious coaching, clarity and intensity will come in time. What is more, they will learn to sing F major in tune!

Notes

¹ Walter Ehret, *The Choral Conductor's Handbook* (New York: Edward B. Marks Co., 1959), 18.

² Victor Alexander Fields, *Foundations of the Singer's Art* (New York: Vantage Press, 1977), 189. For a sampling of views compare D. Ralph Appelman, *The Science of Vocal Pedagogy* (Bloomington: Indiana University Press, 1967), 86 ff; Wilhelm Ehmann, *Choral Directing*, trans. George D. Wiebe (Minneapolis: Augsburg, 1968), 41; William Vennard, *Singing, the Mechanism and the Technic*, rev. ed., (New York: Carl Fischer, Inc., 1967), 68-69.

³ This observation is supported by Cornelius L. Reid, *Bel Canto, Principles and Practices* (New York: Coleman Ross Company, 1950), 67, 89, 93.

⁴ Ray Robinson, Alan Winold, *The Choral Experience* (New York: Harper's College Press, 1976), 76-79. See also Appelman, 91.

⁵ Reid, 67, 89.

⁶ Vennard, 78. See also 73.

⁷ Vennard, 73.

⁸ Vennard, 77.

⁹ Reid, 71.

¹⁰ Vennard, 58.

¹¹ Vennard, 76, 77, 79.

¹² Vennard, 74-75.

¹³ Vennard, 63-66.

¹⁴ Vennard, 76, 77, 79.

¹⁵ Appelman, 100-101; Vennard, 77; Reid, 86.

¹⁶ Vennard, 76.

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