Stages, Phases or an Infamous Exit?

If you are teaching singing or choral work to boys aged between 10 and 16, you must expect to deal with puberty and its effects on the voice. You need a certain amount of information and understanding to get the best out of the voices in your care, and to ensure that they come to no harm. Elsewhere I have written a detailed academic paper replete with medical details and statistical analysis. Here I set out the basics of what teachers and conductors working with young adolescent voices need to know about the approach advocated in that paper. By all means study the paper if you wish to go deeper.

First, let us deal with infamous exits, or what the American voice teacher and author Kenneth Phillips calls "the infamous English voice break". Fundamentally, this is when you don't deal with puberty and plough on largely in ignorance either of what it is or how it is affecting the boys in your care. In this system "voice break" is often quite wrongly assumed to be something that happens when a boy "hits puberty". Most boys continue to sing soprano (or "treble" if you prefer) for some time after puberty has begun and the so-called "breaking" of the voice, which may be a public or private event, is better ascribed to a failure to understand the process. It is reputed that Benjamin Britten was the victim of a sudden public voice break when David Hemmings, his star at the time, suffered a catastrophic "crack" and breakdown in the middle of a performance of *Turn of the Screw.* Britten was himself directing, so in one sense, you are in good company. However, as Jenevora Williams has astutely pointed out, you are running a risk if you do this. It might have been an acceptable risk in Britten's day, but with the ethical standards we work to with children these days, it probably isn't.

So, don't ignore puberty. Understand what it is and know how to recognize it in the voice. Ironically, it is perfectly possible for boys to sing soprano whilst also being physically capable of fathering children. Indeed, it is possible for a boy to grow up and become an adult male sopranist (not to be confused with castrato, there is no operation!) Go to a concert by *Chanticleer* if you find this hard to believe. But you must know what you're doing to achieve this, and very few people today do. When you don't know what you're doing, the boy will of his own accord (he doesn't know what he's doing either) start going into falsetto. This falsetto can take different forms. In some boys, it can sound remarkably similar to a good "head voice" whilst in others it quickly becomes a squeaky, scratchy and breathy sound. Either way, it may end in tears or an infamous exit, and a broken voice that may be expensive to repair (I know some singing teachers who make quite a good living sorting out ex-choristers who wish to train as serious classical singers).

Puberty Stages

Puberty stages as we know them today were devised by an English paediatricain named J.M. Tanner. Tanner conducted extensive studies of growth in an orphanage in Harpenden. The study had been

commissioned by the British government to observe the effects of malnutrition on growth during the second world war. Tanner extended the study from 1948 onwards, turning it almost into something of an art form. It was certainly visionary and a prototype for the many longitudinal growth studies that have been conducted since. Tanner had noticed that during adolescence, children gained height much more rapidly, and that the height gains tended to come in spurts. He believed he had identified five discrete stages and that these could be most easily recognized through observation of the growth of pubic hair and the genitalia.

This is both a blessing and a curse. Obviously, observation of boys' private parts is not something teachers or choir directors would consider doing and boys would not go near them if they thought they might! However, in medical practice, it is still quite common to check boys suspected of delayed or precocious puberty against reference photographs derived from Tanner's work. Doubt has been cast on the reliability of this practice, even when carried out by trained GPs. If a suspected problem is confirmed through the Tanner photographs, it is likely that a boy needs to be referred to a specialist endocrinology clinic for more detailed and sophisticated tests. However, people have long wondered whether there is any valid and reliable relationship between these stages and the voice. Tanner himself was at best skeptical about such an idea, but several researchers over the years have shown that there is at least some relationship.

The best-known of these today is almost certainly John Cooksey, who died in 2012. Cooksey identified not five but six stages of vocal puberty. The relationship between these stages and the Tanner photographs has been investigated and some weak correlations have been found. The question that concerns us here is twofold.

- First, how can a singing teacher or choir director identify the stages?
- Second, having identified a boy as being at any one of six stages, is that information of any practical use?

It is possible to identify potentially critical times in a boy's development through regular measurements of height. This is a non-intrusive approach that few boys object to if done sensitively. Tanner made his measurements at three monthly intervals and this is probably about right. It is the time interval I used in my own studies for all but one of the boys, who I measured monthly. I found no particular advantage in monthly height measurements, so three months it is! It is important to understand that what you are looking for is not how tall the boy is on any one occasion, but how much he has grown since the last time you measured him. Over time, you can then work out how quickly he is growing, his *growth velocity*. A temporary increase in growth velocity is a fairly sure sign of a growth spurt, which almost certainly means that another velocity has also increased, that of *voice deepening*.

Boys' voices deepen all the time they are growing. There's nothing magic about it! The vocal folds (please don't call them cords and certainly not chords!) and vocal tract increase in length for as long as the boy increases in height. This is nothing to do with puberty. Compare a three-year-old with a nine-year- old. You should detect a big difference! However, if there is a growth spurt in height, we might expect a corresponding growth spurt in voice deepening and we do know that at certain times during puberty, this deepening velocity can be particularly rapid. How can it be measured? The simplest way is to ask the boy to count slowly backwards from twenty in a monotonous voice (don't let him get excited or shout) and see if you can roughly match what you hear with the notes of a piano, preferably between the numbers twelve and five when the voice will be most settled. Experienced singing teachers can be quite good at it. Alternatively, if you have an iPhone (I'm so sorry there isn't an android version!) you can use the *Speech Test* app, which does the job for you rather more

accurately and tells you how what you have just found compares with the thousand or so other boys in the original study.

The critical, absolutely critical, thing to understand is that what you are measuring (or should be) is *voice deepening velocity*, which means that to be of any real use you have to do it at regular intervals, ideally every three months. One reading in isolation is useless. There are tall, boys, short boys and in-between boys. There are high-voiced boys, low-voiced boys and in-between voiced boys. So what? It is how an individual boy differs from one measurement to the next that is the only thing that counts.

So, is it practical to measure the height and voice pitch of every one of fifty boys in your choir every three months? Almost certainly not – unless you get the boys themselves to do it. Some families do have pencil marks on the kitchen door frame. If an iPhone is available, they can add voice pitches such as 196Hz to it! If you have explained everything I have just explained to your boys, they may be keen to do this and that is a good thing when compared to the poor chorister who knew nothing other than that one day his voice would break (does it hurt?) and his career would be over. It doesn't matter if they forget or don't do it very accurately. What matters is that they come to you and say they think they're changing. You can then do the test more accurately.

Puberty Phases

I said earlier that if kept on as a "treble" a boy will of his own accord, without really knowing what he is doing, start going into falsetto. Well, think about it. A boy has been doing something like this all his life. Since early infancy, his voice has been very slowly deepening. If he joined a choir at age eight, he will have learned how to make his voice fit the pitch range of the music you give him to sing (we hope!) This tends not to be a problem before the adolescent growth spurts begin. The boy very slowly adjusts so that his singing voice continues to fit the range of the songs. He can do this because he is growing slowly. Ask him suddenly to do it more quickly to keep up with increased change velocity, he will find it a lot harder and things may start to go wrong. But in so many choirs, he is made to wait. He must continue trying to make his voice fit the soprano part until one day he must try and make his voice fit a tenor or bass part, quite possibly because the choir conductor needs more tenors. This is neither easy nor in the best interests of the developing young singer. Is it any wonder that so many boys give up on singing between the ages of eleven and fourteen?

So, is the answer to tell a boy he is "stage three" in puberty? I think not. There's no harm in boys knowing about puberty stages and they can be quite interested, because after all it's about them and their bodies. But in the hands of the over-zealous singing teacher, this can be just substituting one set of problems for another. Education went through an unfortunate phase when children were being told that they were "kinaesthetic learners" or "visual learners" largely because an influential group of teachers had half-understood work on perceptual styles in learning. Labels are not generally helpful, but, there again, "soprano" or "tenor" are sorts of label, aren't they?

An alternative to Cooksey type stages has been developed in Germany by Michael Fuchs. Fuchs prefers to think in terms of three broad phases which he calls the *premutation*, the *mutation* and the *post-mutation*. Importantly, these are phases of *change*. They are preceded by a period when the boy is in all respects still a child but will have developed a singing voice that Cooksey described as the "climax of beauty and fullness". The word "premutation" has a different meaning for Cooksey than for Fuchs. We are using Fuchs' meaning here. During this premutation the boy can still sing soprano or alto, but puberty is beginning to make itself felt and the imminent end of the soprano/alto career needs to be anticipated and planned for. During the mutation the voice is unstable, and the boy can

really struggle as his speaking voice deepens rapidly in pitch. During this time boys in Leipzig's famous Thomanerchor (where Fuchs is the "voice doctor") generally drop out of the choir, though they remain in the school and continue to have singing lessons. During the post-mutation, the voice has completed its most rapid deepening and the young man can begin to learn how he will fit it to tenor or bass parts. He will rejoin the choir at some time during this phase when his teacher thinks he is ready.

For a number of years, I looked at boys through both a Cooksey and a Fuchs lens and could not help thinking that the Fuchs classification system described better what I was actually seeing. Neither system described perfectly the lifecycle of an English chorister, but the Fuchs was the nearer. It was when I began working with Professor Gary Butler, a consultant paediatric endocrinologist, that I could see my way to endorsing a three-phase approach in preference to a six-stage approach. Butler's own research had shown that judgements of boys' puberty by non-specialist medical practitioners (i.e. GPs and nurses) were not very reliable when the Tanner system was used. He had in consequence advocated a three-phase approach for the use of GPs, nurses and similar practitioners when he drew up the RCPH boys' growth charts. This was sufficient for general medical practice. If more detailed investigation were needed, the boy could be referred to a specialist who could identify more precisely what was going on by means of accurate measurement of testicular growth.

Butler's RCPCH phase system is reproduced below. It will be seen that there is correspondence between phases and Tanner stages.

Identification of boys' puberty phase in RCPCH national standards

Pre-puberty (Tanner Stage 1) ***All** of the following*	**In Puberty** (Tanner Stages 2-3) ***Any** of the following*	**Completing Puberty** (Tanner Stages 4 – 5) ***Any*** of the following
High voice No growth of testes or penis No pubic hair	Slight deepening of the voice Reddening of the scrotum and growth of the testes Early penile enlargement Early pubic or axillary (armpit) hair growth	Voice fully changed (broken) Adult size of testes and penis with adult pubic hair and axillary hair growth

CHILD SINGING	PHASE 1 SINGING	PHASE 2 SINGING	PHASE 3 SINGING

I believe the same is true for voice assessment in singing, but with some differences. This is shown by the bar below the chart. The transition from child singing to the first phase of adolescent singing does not map neatly across the transition from pre-puberty to in-puberty. The term peri-pubertal is a useful one to describe boys in this situation. There is significant uncertainty as to precisely when pre-puberty becomes in-puberty in individuals for the simple reason that it can only be determined with unacceptably intrusive testing. We may have to accept that we shall never know! Rather more significant than this in any case is the considerable impact of *human agency*, by which I mean the choices and preferences made by boys, their parents, teachers, and conductors. If a boy chooses to extend his time with voice parts appropriate to the child singing phase, he can and will. Whatever may be said in theoretical research, most English boys with developed treble voices continue to use them during the time when speaking voice pitch falls from over 230Hz to less than 220Hz. It is by no means uncommon to find boys on treble parts well into the in-puberty phase and despite the protestations

of singing teachers, what sounds like a good “head voice” is often achieved by what is more likely to be a form of transitional or hybrid phonation.

The converse is also found. Where a boy places little or no value on a treble voice, he may well attempt to sing in a lower range than is comfortable for where his speaking voice pitch is situated. This seldom results in beautiful tone, still less the development of a singing range that is not entirely dominated by the speech voice register. I am unable to conclude after many years investigating these phenomena that many published studies of adolescent voice change pay sufficient attention to agency. The human factors need to be considered and worked with. It is where I have all too often seen things turn unpleasant. A dogmatic singing teacher meets an intransigent choir conductor, and the boy (and his parents) can be left in the middle trying to make sense of things.

As a general rule, during singing phase 1, most boys do not change their initial allocation to a soprano or alto part, though it becomes wise to reduce the demands that are made upon them and plan for what is to happen next. Second treble or alto in preference to first treble, definitely! As he moves into phase 2, he moves into a period where his voice simply will not fit neatly into any of the soprano, alto, tenor or bass categories. At the beginning of the phase the timbre is still what I call “boy-like” and if he sings in the right range, the sound can be both uniquely beautiful and seldom heard or appreciated. What is the right range? It could be what we now call “cambiata”, but in the early sixteenth century was called a low meane. Some rather good choral music was written in the early sixteenth century!

If neither of these options is available, there is still a case for the boy not singing at all for a while. At least in a choir. He can (and should) continue 1:1 singing lessons, but the nearer he gets to the end of phase 2, the more likely it is his voice just isn’t going to work anywhere in an SATB choir. You’ll know when phase 3 is approaching because his speaking voice will start to deepen much more rapidly at the same time as it changes in timbre from “boy-like” to the characteristic “young man” sound. Once he is comfortably in phase 3, he will be the possessor of a general purpose lowish voice which, for want of a better term, we call “emerging baritone”. During this phase experimentation with gentle singing of what may eventually be the future part can take place, though most knowledgeable teachers recommend that this is *not* the time to play about with counter-tenor.

Importantly, the phases are easy to identify with *Speech Test*, and what you need to remember is this. During phase one, the readings you get will be lower than for a smaller child, typically in the range 200 – 220Hz, but they won’t change much. In fact, they will probably go up and down a bit and, although you think a boy is on the cusp of puberty, you may even get a slightly higher reading than you did three months previously. Once phase 2 has begun, you will be in little doubt because the reading ahead will certainly be lower and in probably most cases, you can almost see the change happening before your very eyes in app readings spaced at three monthly intervals. All voices will drop quite quickly from just below 200 Hz to 150Hz or lower during this phase. During phase 3, the voice can go surprisingly low, even below 100Hz is not uncommon. It may then creep up again to its eventual adult state, which simply confirms that, though “baritone”, voices are not yet settled.