Piano Technique

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This guide contains numerous technical exercises which require careful use. Like any form of physical activity, they carry an element of risk. The reader agrees to take full responsibility for her/his own safety, and to indemnify the author for any injury resulting from the use or misuse of the book.

Contents

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Introduction

This guide aims to be clear, concise and practical. It draws on a number of well-known sources (see page 59), but, above all, it is the result of several decades of observation and experiment. Standard aspects of technique are discussed, but special emphasis is given to areas, where, it is hoped, some new light is shed upon either the technique itself or the way of explaining it. A selection of exercises mentioned in the text can be found at the end of the guide. Further exercises can be found online via this link: http://www.scoreexchange.com/profiles/paulwhite743

In any project, the initial design is of critical importance. Years of dedication and hard work are often wasted on flawed designs, for example, on civil engineering projects which collapse soon after completion. In the case of piano playing, countless thousands of talented and hard-working students have failed to realize their potential due to faulty technical instruction. A correct understanding of the basic principles of technique affects every single note we play, so that each moment of our practice will be put to optimum effect. One result of the preponderance of poor technical teaching which took place in the twentieth century is that many people have abandoned technique, considering it to be a waste of time. To these people I would reply that having no technique is better than having a bad one, but having a good one is the by far the best option. It is sometimes said that, if we focus entirely on the musical aim, the technical details will automatically fall into line. This has some validity, especially for talented people who have a natural aptitude for doing things in the right way, but it can also lead to very inappropriate solutions, just as when amateur singers seek to impress their audience by shouting, but fail to come anywhere near the power and beauty of tone achieved by the opera singer. Similarly, the untrained pianist may strive for brilliance in passagework by means of repeated downward strokes of the arm, or by pressing forward into the keys.

Of the many schools of piano technique which have existed during the last century, the most influential have been the “arm weight” and “raised finger” schools. The first of these has tended to use a maximum amount of arm weight whilst virually ignoring finger movement, whilst the second has done exactly the reverse. The central theme of this guide is that musical tone consists of an inseperable combination of *both* of these elements, and that we should not only be able to use each to the maximum extent but also to use them in a controlled way, so that the amount of arm weight and finger speed, and the proportions of each, can be varied at will. Only by doing this can we achieve variety of dynamics and touch, and the ability to emphasize different voices in a musical texture.

Teachers often tell people what musical result to aim for, but not *how* to achieve it or *why* we would do it in that way. This book attempts to fill in those gaps. Neverthless, in studying the technical principles, we should never lose sight of the artistic aim, as this is the whole point of the exercise. Above all, unless the music demands otherwise, we should always aim to achieve a ***singing tone*** in our playing. This will help us intuitively to combine the various aspects of technique and guide them towards the creation of a truly beautiful performance.

The greatest physique in the world is of no use without a brain attached to it. A fundamental aspect of playing which is often overlooked is that we always hear the music in our head before we play it. Even in sight-reading, we see the score, hear the music in our “inner ear” and translate what we *hear* into finger movements at the keyboard. Developing the inner ear is therefore an indispensable element in piano technique. This can be achieved through aural training, musical dictation and “mental practice” (see p. 50).

Many hours are wasted at the piano by adopting an attitude of blind faith and mindless drudgery. We should instead take an analytical and diagnostic approach, identifying and focusing on core issues rather than taking every technical problem in isolation. To take just one example, many problems of evenness are caused by weakness in the outer fingers. Honing in further, a particular weakness is the alternation of fingers 4 and 2 together with 5 and 3 together. Still closer investigation reveals that the alternation is more difficult from 4/2 to 5/3 than the other way round. Other difficult moves include from 3 to 4 and from 4 to 5, where we are moving from a stronger, longer finger to a shorter, weaker one. These moves can be practised as grace notes or using Exercises 9 and 10E at the end of this guide. In this case, by tackling the root cause, we will solve a wide proliferation of problems concerning evenness. This differs from the approach of teachers who believe in dealing with technical matters only as and when they arise in the course of learning pieces, although

that is also an important element in technical training.

A word about injuries

Compared with some "relaxation methods", the approach recommended here is quite a vigorous one. It should be used in a sensible and moderate way, especially to begin with. It is a dangerous mistake to suppose that a method which yields good results will yield even better ones when taken to extremes. I personally have been playing the piano for fifty-seven years and have never suffered an injury, nor, to the best of my knowledge, have I ever caused anyone else to have one. Even so, one cannot be too careful!

A number of manual activities undertaken by most people on an everyday basis, including housework and gardening, many lead to stiffness in the hands. The index finger of our dominant hand is sometimes required to exert pressure for long periods, for example when using aerosols and spray guns. A similar case is writer's cramp, common among students at school or university. This is fortunately diminishing thanks to the increasing use of computer technology, only to be replaced by misuse of the thumbs on mobile devices. Such problems can often be remedied by means of stretching exercises related to Yoga, several of which are explained in the chapter on therapeutic exercises (p.41).

Excessively strenuous practice may cause some people to experience difficulty in bending their fingers when they first wake in the morning. In this case, do not use force to bend the fingers, but gently coax them into a rounded position using the other hand. At the same time reduce the arm weight and finger action in practising until the problem disappears. Injuries are caused not only by an extreme approach to lifting the fingers, but also by requiring them to bear too much weight.

In recent times, an almost paranoid aversion to injuries has given rise to varous technical methods which are geared more towards protecting the fingers than towards achieving a convincing musical performance. In particular, finger exercises are described as "dangerous". I would propose the contrary argument, namely that the development of strong finger muscles is not only necessary in achieving effective musical results, but is also the best way of guarding against injury, provided it is done in a gradual and moderate way. There is an element of compromise between achieving the best musical result and being kind to the hands. A musician of integrity will always place the artistic aim first.

Posture

Freedom of movement is our aim, not restriction and rigidity. This applies firstly to the process of breathing, which can sometimes inadvertently come to a halt when we are intent upon a demanding task. Of equal importance is the way we sit, which should be tall but not stiff, with the shoulders relaxed and down, yet with a certain feeling of buoyancy. Some slow, gentle rocking back, forth and sideways from the hips keeps the joints of the arm mobile. Posture and seating position affect the way in which arm weight operates. If we sit too close to the piano or lean forward, as sometimes happens when sight-reading, the arms will push the hands forwards, jamming the wrists and forcing the fingers to play from an awkward angle. Moving back a little and returning the trunk to a vertical position will cause the arms to pull the hands gently *backwards*, restoring them to a healthy playing position. If we imagine arm weight to be operating *vertically* on the keys, this will in fact cause the arms to straighten and push forwards, creating the same problems as mentioned above. We should think of the elbows as wanting to bend and pull backwards, the wrists as being drawn downwards and the fingers as pulling at the keys.

Finger Action

The relationship between finger action, arm weight and arm movement

Music is brought to life by means of contrast and variety. Just as the owner of a powerful sports car is able (though not necessarily willing) to drive both slowly and fast, so the pianist with a strong technique can play music which is both quiet and loud, slow and fast. Anyone watching a virtuoso performance of one of the great Romantic works, for example, will realize that, at the more passionate end of the expressive spectrum, this can be a very high impact activity. Weak pianists can only produce quiet tones, resulting in a dull, monochrome effect, and will be unable to play clearly at speed (see p.21). They will also have difficulty in

emphasizing particular voices in a texture, for example bringing out a melodic line. Therefore in our practice we aim to build strength, both in the muscle tissue itself and in the power of the neuro-muscular impulse. These two form an inseparable combination. To this end, given that the body gradually adapts to demands placed upon it, the way to build strong fingers is by requiring them to transmit the maximum of kinetic energy to the keys (see p.38). The initial paragraphs which follow refer to *practising* finger work in technical exercises, scales and passagework, not to the *performance* of quiet passages, and not to the playing of chords and octaves.

The greatest piano teacher ever was Sir Isaac Newton, although he did not know it. The observations which follow are all based on simple Newtonian mechanics. They may sound very complicated compared with the facile solutions offered by many traditional schools, but provide the only valid description of what really happens when we play.

The force needed to move an object (in this case a piano key) is *kinetic energy*, which is a combination of weight and speed, as stated in the equation *KE (kinetic energy)* = $\frac{1}{2} mv^2$ (where m = mass and v = velocity).The weight is provided by resting some of the arm's weight on the keys. This is *initially* introduced by "dropping" the arm's weight on to the *first* note of a phrase or passage (p.34). Many existing methods deal with the initial dropping, but fail to describe adequately how the *remaining* notes in the phrase or passage are played, *i.e.* the vast majority of the notes. These are produced in an entirely different manner.

For these ensuing notes, when the fingertip strikes the key, the knuckle pushes upwards with equal force and reacts against the arm weight resting on the previous key. This causes the arm weight to react back downwards upon the finger with an impulse of kinetic energy which will depend on the amount of weight which was resting and the speed of the finger stroke. It does not imply a downward movement by the arm (except on the first note.) It is like saying, "When we push against a wall, the wall pushes us the other way."

Similarly, if I wish to push a trolley, my arms push both forwards against the trolley and backwards at the shoulders against the weight of my body, which in turn reacts forward against the arms. It is by this process of opposite reactions that I apply my weight to the trolley. In the same way, in the case of the cyclist, the leg extends, pushing down upon the pedal whilst pushing up at the hip against the weight of the body. It is by the muscular exertion of the leg that the body's weight is applied to the pedals. In the case of piano playing, it is by the muscular exertion of the fingers that arm weight is applied to the keys. The arm's role is purely passive, the driving force being the finger strokes. The various actions and reactions described in all these examples happen simultaneously.

All this sounds very theoretical, but its practical implication is that arm weight alone achieves nothing. It is engaged by the finger stroke, and its effectiveness depends on the strength of the finger action. Therefore, we need to build strong fingers. The finger stroke *lifts* the arm's weight off the previous key and brings it to bear on the next key at a certain speed. At the same time, the previous finger retracts, "giving" the weight to the new finger, which again reacts against the weight at the knuckle and delivers it to the key at a particular speed.

It will be seen from the equation above that the speed is even more significant than the weight. This refers, not to the tempo of the music, but to the speed of the individual finger stroke. By doubling the weight we also double the kinetic energy, but by doubling the speed we *quadruple* the kinetic energy. In order to accelerate to a high speed, an object needs a certain distance over which to travel. This applies to the finger approaching a piano key. It must be lifted high and brought down as fast as possible, just as a builder lifts the hammer high before bringing it down upon the nail. This is particularly true of the 4th and 5th fingers, which are weaker than the others. In the same way, the cricketer, tennis player or golfer swings their bat/racquet/club well back before driving it rapidly towards the ball. The speed and suddenness of the finger stroke, even in slow tempo, are even more important than the height.

As any motorist knows, it requires more power for accelerate rapidly over a short distance than to do so gradually over a longer stretch. Therefore, by raising the fingers, we are in fact making life easier for our

downward (flexor) muscles. Anyone who feels that this is too easy can increase the difficulty by playing even louder! The method also gives more work to the extensor muscles which *lift* the fingers off the keys. It should be stressed that the movements involved in piano playing are on such a small scale in terms of both distance and time that we are entirely unaware of any "gradual acceleration" taking place, and do not try to induce it deliberately. We simply lift the fingers high and bring them down rapidly.

All this will no doubt provoke a reaction of outrage among those teachers who say "Never hit the piano!" I would stress that I am referring here to striking or hitting the keys with the *fingers*, not with the arm. Hitting with the arm is not used in practising passagework. Indeed, it is reserved for very animated and even violent episodes of "martellato" playing. However, striking with the fingers is an essential element in piano technique. Those who would deny this are as good a football coaches who say "Never kick the ball!" It is true that the sound produced in this way is a hard and brutal one. However, we should distinguish between a practice method for building strength on the one hand, and the gentle art of performance on the other.

To sum up, these points imply that, when aiming to build strength, we need to rest arm weight on the keys and use a high, rapid, sudden finger stroke, even in slow practice. This should be done very vigorously without being taken to extremes. The piano mechanism presents only a moderate level of inertia, therefore using a disproportionate amount of force is both mechanically inefficient and artistically inappropriate, as well as being very tiring and potentially injurious. Even so, we should not practise in an inhibited or lukewarm way. In *performance*, however, both the weight and finger action are often reduced (See p.21).

Traditional piano methods often tried to isolate the finger movement, with the wrist and arm being in some way frozen or paralysed. The hand was artificially held in a horizontal position by the muscles on the upper side of the forearm. This is conducive to poor tone and can cause stiffness and injury. Further confusion was caused by Matthay (see p.59), who suggested that the arm should be "poised", i.e. supporting its own weight. If instead we rest *some* arm weight on each key and allow the arm to be passively moved up and down by the finger strokes, there will be no stiffness. The arm movement is very small in scale. There will also be no danger in lifting the fingers to a comfortable height, and using swift, decisive finger strokes. Indeed, these are indispensable prerequisites of clear and well articulated playing, particularly at high speed. It is perfectly natural to lift the fingers when playing, as can be seen by watching any child at the piano.

Nevertheless, we should not force the fingers to painful levels of lift, or hold them up rigidly when they are not playing, as this reduces the power of the downward finger strokes and causes discomfort. Here, the law of diminishing returns applies. As we move towards unnatural extremes of lift, the additional height gained, relative to the amount of effort and discomfort, will be less and less. On the other hand, it could be argued that because the lifting muscles are working against a resistance at this point, they are applying more effort and are therefore gaining in strength. Accordingly, a reasonably high finger lift is good in practice, but less efficient in performance. Greater lift can be achieved without pain by means of stretching exercises (p. 43-4). Unused fingers should be held at a comfortable height, and kept gently but not excessively curved.

Although the arm does not take an active part in the production of individual notes, it is in no sense a "dead weight" dragged around by the fingers. On the contrary, arm movements from the shoulders, via the elbows and wrists, are used to guide the fingers as they navigate laterally around the keyboard in phases and longer sections of passagework. The arm movements complement those of the fingers like a dancing partner. For this reason it is essential to consider the arm as "semi-poised", with a certain amount of weight in it, but also with buoyancy and freedom of movement.

The wrist may move laterally, vertically, in circles or with a rocking "rotary" motion. To induce such freedom, play a one octave arpeggio up and down repeatedly. The right wrist will move in an anticlockwise ellipse, wide but not tall, whereas the left hand will move clockwise. The hand in this case remains horizontal, without rotary movement. Extend the exercise to wider-ranging broken chords and arpeggios. In arpeggios, the wrists and elbows move to the right on the note after the thumb and left on the thumb note when ascending. The opposite takes place when descending. Anticipating the contours of the music with arm movements greatly facilitates playing passagework. However, it should not be done in an exaggerated

or theatrical way. As with arm weight, it is used in partnership with finger work, not as a substitute for it.

An entirely distinct form of arm action (p.33) is used for playing chords, octaves and melodies which are emphatic and declamatory. Nevertheless, in playing octaves, an element of finger action adds firmness to the touch. Much real music combines melodic phrases, chords, octaves and other elements in a complex texture, and here the finger and arm actions are continually alternating, sometimes occurring together, for example when the right hand plays passagework accompanied by staccato chords in the left hand.

Finger action diagrams

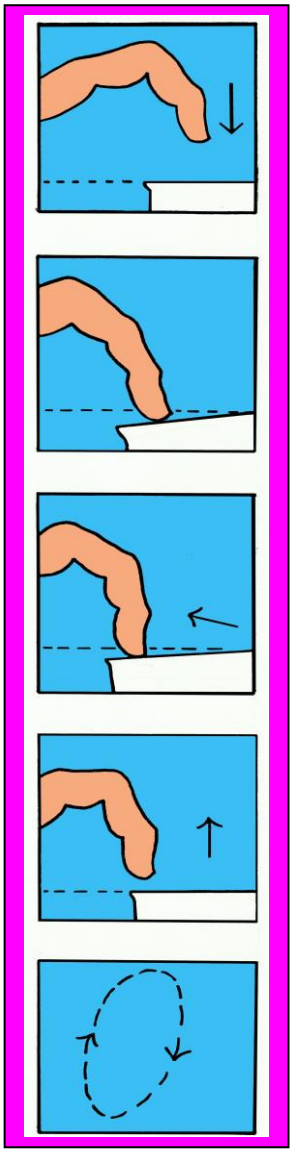
The finger is curved and raised above the key. The left hand portion of the picture represents the knuckle end of the hand.

The finger straightens as it descends, and begins to bend as or just before the tone sounds and the key touches its bed.

The finger rebounds and slips back a fraction, bending slightly as it does so, and allowing the key to raise slightly, but not sufficiently to cut off the tone. It then settles back on the key with a moderate "resting weight"

The finger releases the key and returns to the original raised position, bending slightly more as it does so.

Overall shape described by the finger end. It is helpful to imagine the fingers walking (legato) or running (non legato) on the keys.



The extending finger action

This is illustrated in the diagrams above. The finger action is a like a wave movement or "wing action" (see p.33), with the knuckle bending first, while the other joints are still straightening. The fingertip and middle phalanx begin to bend just before the sounding of the tone and continue to bend as the knuckle joint straightens, lifting the finger from the key. This is similar to the way in which guitar strings are plucked.

It is important to note that the extension applies to the ***approach*** to the key, ***not*** to the sounding or holding of the tone. These weight-bearing parts of the cycle should be done by the flexors, not the extensors, otherwise we will experience a jarring similar to that felt in the knees when running downhill. In other words, we are pulling the key, not pushing or stabbing it. It is the pulling sensation which we feel in performance, the extension being largely unconscious. The pulling of the key is not particularly visible, but is experienced as a tugging sensation in the fingertip. This tugging serves to counteract the backward pull of arm weight. In slow practice, we can think of aiming slightly further forward than the vertical, then pulling back a little with the fingertip.

The extending fingers land on the key almost vertically, giving maximum transmission of energy. If the approach is made with a rigid or, still worse, bending finger, we will strike the key at an oblique angle, with considerable energy loss. One centimetre of vertical finger travel causes the same amount of key movement. A centimetre of oblique motion moves the key only a fraction of the distance, so that the key travels more slowly and the tone is weaker. For this reason, I disagree with the school of technique in which the fingers are almost straight when raised, and gradually bend as they approach the key. However, when playing rapidly with a *leggiero* touch (see p.21), we can adopt a "cyclic" finger action, as shown in the last diagram above. Here the finger begins strongly curved in a raised position, straightens until it is roughly half-way down the stroke, then begins to bend as it nears the key, so that the fingertip is drawing a tilted oval shape as it goes round the cycle. This brings freedom of movement whilst sacrificing something in terms of volume.

The action in the first, second and fourth pictures (p.7) is sudden and rapid, even in slow music. The fingers are propelled by sudden impulses of energy not unlike the explosions which drive an internal combustion engine. As we aim to exercise the fingers and build strength, we should take them through their full range of movement with swift, energetic strokes. The tone begins in the second picture and is held until the third. During this time the fingertip starts to pull in, rebounding from the key then falling back on to it and resting on the key bed with moderate weight. The rebound and falling back are on a very small scale and do not allow the key to rise to the point where the dampers cut in. Whilst holding the tone we feel the fingertip gently pulling the key down and backwards. At the same time, the knuckle end of the finger continually pushes up and forward, maintaining a gentle tension in the arched hand which serves to balance the backward and downward pull of the arm weight. This tension and arching should not be taken to excess, as it will lead to fatigue.

The hanging hand

As described on p.5, the finger stroke drives the arm up and forward at the knuckle. The finger then partially supports the weight of the arm, and also helps to support the weight of the hand. To appreciate this, allow the hand to hang loosely from the wrist, then lower it gradually so that the fingers touch the keys. As we lower it further, depressing the keys, the key bed will lift the hand into a horizontal position. During this process, the pressure on the fingertips will gradually increase, as they are supporting more and more arm weight. Now slowly raise the arm again, *allowing the hand to return to a hanging position rather than trying to keep it in a horizontal alignment with the arm.* This is the most stylish and relaxed way to end a phrase.

When the arm is fully poised, i.e. consciously held up, for example during a rest or in *leggiero* playing (p.21) or staccato, the hand should not be deliberately held up in a horizontal position. Doing so causes stiffness in the wrist and tires the muscles on the upper side of the forearm unnecessarily. Instead it is allowed to hang loosely, giving an appearance of a high wrist position. The only exception would be if we wish to achieve a crisp, dry staccato it quiet, rapid passagework, in which case we lift the hand and keep the wrist low. Even with the hand hanging, there is a feeling of very gently pulling back with the arm, but this time it pulls back and *upwards*, whilst the fingers still tug or stroke the keys towards the player (also very gently) to counteract the backward pull. There is a sensation of great looseness in the wrist, almost as though the hand and arm are being drawn apart at this point. Usually we play with the hand partially hanging and partially supported by the keys, again giving the appearance of a slightly high wrist position. The hanging hand is also used in playing octaves with a wrist staccato (p.31).

The relationship between touch and speed

Notes produced by means of arm movements can only be played up to medium pace. More rapid notes are played purely by finger work, supported by varying amounts of arm weight. This is because a given muscle will only repeat its action up to a certain speed. The fingers, however, are sharing the work between five team members, so that no one finger is obliged to repeat immediately. For this reason, when we practise a passage slowly and gradually speed it up, there will be passive arm movements at low speeds, but these will decrease as the speed increases, finally disappearing altogether. There will also be a change from legato, where the arm weight is always supported by at least one finger, to non legato, where the weight is "bounced" from finger to finger, with a short airborne phase, creating a silence, in between. This is analogous to a person walking faster and faster and eventually "breaking" in to a run.

9.

Hand shape

The human hand is highly adaptable, changing its shape according to the multitude of different jobs which it has to do. We should allow this to happen, rather than forcing it into a predetermined mould. The "arching" of the hand is often taught as a commandment, without explanation. In fact it is the result of the fingers pushing the knuckles up and forward as they sound and hold the tone (see above). This creates a gentle and desirable tension in the hand which counteracts the backward and downward pull of arm weight.

The fingers are more strongly curved, particularly at the knuckle joint, when playing on white keys. This is because flat fingers would be caught between the black keys. If we were to move the hand further towards us, the thumbs would not reach the keys. However, neither of these misfortunes occurs when playing on black keys, so we can release the fingers into a more gently curved position, although the difference is small. Furthermore, the black keys are raised above the white, so that playing on them with a strongly curved position would require the fingers to be raised uncomfortably high. They are also set back from the white keys, so that the less curved fingers can reach forward for them.

We tend to avoid using the thumbs on black keys, but when we have to do so, the other fingers become more strongly curved than in the normal black keys position, otherwise they would scrape on the lid of the keyboard. Using the thumb on black keys can sometimes solve awkward fingering problems (se p.54).

In slow practice we prepare the position of the fingers (vertically above the key) and their shape (gently or strongly curved for black or white keys respectively) well in advance, preferably several notes earlier (See page 36). The changes in shape are quite subtle, and should not be exaggerated.

Straighter fingers can span wider intervals than curved ones, and are better for certain chords and arpeggios, except where they come between black keys. Occasionally, when a white key is easily accessible to a straight finger (usually B, C, E or F), and when curving the finger would render the stretch uncomfortable, we can straighten the finger somewhat. An example would be a double sixth from Ab to F in the right hand played by the thumb and fourth finger, as found in Chopin's Study Op. 25 no. 8. Bending the knuckle joint reduces stretch more than bending from the other joints, so where there are wide stretches we can keep the knuckles fairly flat and increase the movement of the other two joints, pulling the finger tips in as we play the notes. However, in the initial practising, it is good to bend from the knuckles and force the fingers to stretch more. This follows the principle of making things hard in practice and easy in performance.

A rounded finger shape, with the finger tips consciously pulled in, is necessary for supporting the arm weight when playing firmly. The straight finger forms a longer lever than the curved one. Playing with straighter fingers is like driving in higher gear, particularly in the case of people who have long fingers. For a given rotation of the knuckle joint (not to be confused with forearm rotation), the fingertip will travel further and faster, but will be at a disadvantage in terms of torque when acting as an interface between arm weight and the upthrust of the keys, or, for that matter, when resting arm weight on the key bed. To compound this, the key's resistance is greater at its inner end than near the tip, so that by bending the fingers we will often be able to avoid striking the key in that hard place. For the less mechanically-minded, this paragraph means that straighter fingers are better for playing with a light, "*leggiero*" touch and less good at bearing arm weight.

In "*leggiero*" playing, the fingers can be more flexible, in three ways: Firstly, a less rounded shape can be used, allowing for greater articulation, as the fingertips can be lifted higher. Secondly, a greater differentiation in shape is possible between the black and white keys. Thirdly, the "cyclic" finger action (see last diagram on p.7) can be used more liberally, with the finger beginning to bend slightly earlier in the cycle, about half or two thirds of the way down the stroke. In this way we acquire greater agility at the expense of volume. The selection of touch therefore depends on the expressive requirements of the music. Rapid passagework is practised firmly but often performed with a *leggiero* touch.

Longer fingers, especially the third, are more strongly curved than shorter ones. The little finger is curved in the up position and virtually straight in the down position. The hand should not "sag" towards the fifth

finger, which should form an almost vertical pillar when playing on the white keys. Otherwise, the fifth finger would be striking the key and supporting weight from a very disadvantageous slanting angle. The finger nails should be very short, as we often, although by no means always, find ourselves playing on the finger tips. People with very small hands often have to play with straighter fingers, in order to span wide intervals. Those with very large hands may need to bend the fingers more on white keys in order to navigate around the black keys.

Even when playing on white keys, a slightly gentler curve is more efficient than a strongly curved, claw-like position. This can easily be seen by playing five white keys up and down rapidly several times, first with strongly curved fingers then with a gentler curve. In the second case the volume and articulation are clearly enhanced. This is because the effective length of the lever is greater, so that for a given amount of movement from the knuckle, the fingertips rise higher and descend on the keys more rapidly. They can also span wider lateral stretches. There will be a reduction of surface noise caused by the fingernails, but an increase in surface noise caused by the finger landing rapidly in the key and "patting" it. Lower noise will be less, as the key will have a "braking" effect on the finger due to the reduced torque (see p.26).

The natural resting position of the fingers is a gentle curve, so that playing with a stronger curve requires continuous effort by the small muscles on the underside of the fingers and hand, creating tension and wasting energy. However, when bearing arm weight, the gently curved position places a greater load on these small muscles, due to the increased torque acting upon them by the longer lever and less vertical angle of the finger. This is nevertheless justified by the improvements described above. By practising slowly, resting some arm weight on the keys, we can accustom the small muscles to the extra load. Having said all this, it is also helpful to do some practising, particularly of held exercises, in a strongly curved position. As in any form of physical training, it is beneficial to use the muscles in ways which are beyond their normal comfort zone. There is even an extreme form of this method in which the fingers are contracted as far as possible, and the keys are played not with the fingertip but with the joint between the fingertip and the middle phalanx. We can also "play" on the palms of our hands with the fingertips.

The difference between the strongly and gently curved positions is quite small. Any further straightening of the fingers would cause problems in navigating between and around the black keys, and would result in unevenness of tone and articulation between the straight and curved fingers.

Care should be taken not to allow the fingertips to "collapse" into a concave shape. This can be avoided by pulling them in slightly when sounding and whilst holding the note, as though "grasping" the key and trying to pull the piano towards us with the tip of the finger. This causes a sensation of focussing energy into the fingertips, which have a feeling of "firmness" as a result. In doing this we are activating the fingertip as a vital link in the chain of transmission whereby arm weight reaches the key. Normally the piano does not move, but instead the arm is drawn towards the keyboard. This counteracts the backward pull of arm weight (p.13). There is a sensation of the arm hanging like a rope bridge, suspended between the fingertip and the shoulder so that its weight can be felt both in the fingertip and in the shoulder joint.

The finger's action is like that of a pickaxe when it bites into the rock and simultaneously tugs at it. The commonly-used expression "firm fingertips" does not particularly refer to the *texture* of the fingertips, but means that they are being drawn in by the flexor muscles below the fingers, so as to avoid collapsing in the other direction. The middle phalanx will be simultaneously drawn in, which is perfectly in order, but we should nevertheless focus solely on drawing in the *fingertip*, which clings like a gecko to its key. This avoids the very undesirable situation where the middle phalanx is drawn in but the fingertip is allowed to collapse. These two joints, however, normally work in tandem. For wide stretches, it is helpful to flatten the knuckle joint somewhat, whilst still pulling in the middle and end joints.

The drawing of the fingertip towards the player whilst playing and holding a note in slow practice translates at high speed into a delightful sensation of gliding across the keys. However, if exaggerated, it reduces efficiency and causes fatigue, partly due to friction occurring when the fingertip is pulled across the key. It can also lead to an oblique stroke, causing a fuzzy tone. Like all changes in finger shape, it should be on a

small scale, particularly when playing in a close position (See also p.21).

The thumb behaves differently from the other fingers. It is not raised, but remains close to the keys, in order to avoid "banging". Exercises for lateral thumb movements should be practised (see ex.3 and 5g). There are easier thumb exercises available commercially (see p.59). Most unevenness in playing is due either to poor thumb work or to weakness in the outer fingers (4 and 5). The last joint (the tip) of the thumb should never be bent, as it would then be too wide to fit on the keys. In order to achieve a feeling of uniformity with the action of the other fingers, we can pull back the thumb knuckle slightly on sounding the tone. Keeping this joint gently pulled back also brings the thumb into better alignment with the keys.

In playing ascending scales and arpeggios with the right hand or descending ones with the left, the thumb should be brought under as soon as the second finger plays, and should then wait above its key while any remaining fingers play. In scales and passages, the thumb should be played more quietly than the other fingers, again to counteract "banging."

The combined action of fingers and arm

The finger functions in part like a hook drawing the key towards us, in part like a hammer descending upon the key, in part like a see-saw with the tip descending and the knuckle rising, and in part as an extending unit similar to a jack hammer. All these functions occur simultaneously, with the result that the fingertip strikes downwards and backwards, and the knuckle drives upwards and forwards against the weight of the arm, which is thereby transmitted to the key by reacting against the finger stroke (see left hand diagram on p.14). The sequence of the combined action at slow and medium tempo is as follows:

The previous note is held with a certain amount of arm weight resting on the key bed (see p.15). The arm is supported by the fingers at one end and the upper arm muscles at the other. About a quarter of the full available weight of the arm rests on the fingertip. In legato playing this "resting weight" remains there until it is lifted off by the next finger. In non legato playing, the weight is dropped by the finger so that it falls on to the next finger.

The arm is driven up and forward again by the stroke of the next finger.

The finger momentarily bounces off the key bed, then falls back on to it before the dampers can engage. This takes place at a microscopic level, which is why it is often overlooked.

The constant support for the remaining three quarters of the arm's weight by the upper arm muscles is still present, so that the amount of arm weight resting on the new key remains at the same level as on the previous note.

Held exercises

Correct hand position, which changes for every group of notes or chord (see p.8), should be practised by means of held exercises. Place the five fingers on the adjacent keys CDEFG with the hand gently arched. Play each finger alone four times, then in alternating pairs (CDCD etc.).The unused fingers hold down their keys. Here, the extension of fingers (p.7) is imperceptible, as the hand is so close to the keys. The playing fingers (except the thumb) are lifted high before striking their keys. The exercise should be played firmly in a legato or non legato touch, and should be repeated, holding down a variety of different chords. (See exercise 1). The Leschetizky Method contains valuable held exercises (see page 59).

As already stated, the finger stroke drives the arm upwards. In legato it falls back down immediately as the finger rebounds from the key bed. In non legato it remains up, with a moderate amount of weight resting on the finger which has just played, then bobs down just before the ensuing note, releasing the weight, which is dropped on to the next finger. The silent held notes take as little weight as possible. This adds more power to the tone, and avoids stiffness in the wrist. Practising legato demands more work from the fingers, as no power is derived from dropping arm weight, and because in non legato the hand can shift slightly during the silences. For this reason, the legato practice is even more beneficial.

12.

Free exercises

A common fallacy is to state that "The fingers are all different, but the arm weight is always the same," with the implication that we can attain evenness in our playing by using arm weight alone, without bothering to exercise the fingers. However, as explained on page 5, volume of tone depends on kinetic energy, which requires a combination of arm weight and finger speed, the latter being achieved by raising the fingers high and bringing them down smartly. In order to attain an even touch we need to exercise the weaker outer fingers preferentially, particularly the 4th and 5th fingers, but also the 3rd, due to its dependency on the 4th, as they share a common tendon. The 4th finger is not especially weak, but it is difficult to lift, due to its relationship with the third. As a result it has less distance in which to accelerate before striking the key. Weakness in these fingers can lead not only to poorer tone but also to uneven rhythm and uneven articulation, if the fingers are slow to lift off after playing their notes. Numerous exercises are available for this purpose, an example being Exercise 7 at the end of this guide. The hand should not sag to this side, but remain arched at the knuckle so as to counterbalance the arm weight. Sadly, the only technique which many younger pupils ever see is in the form of scales, which, although valuable from a theoretical standpoint, actually exacerbate the problem of finger inequality by giving most of the work to the stronger fingers. The 5th finger in particular is used only on one note in some scales, and not at all in others.

The word "free" is not used here in a libertarian sense. It simply means that the unused fingers do not hold down their keys. They remain comfortably high and gently curved, except for the thumb, which lies on top of its key. Repeat exercise 1, without holding the keys down, then try exercise 2. These are played firmly with a legato or non legato touch, using the finger action described on p.5. Begin at mm. = 66 and gradually speed up with the metronome. At slow speed use a legato touch with arm weight and raised fingers. This will "lift off" into a non legato at roughly 260 notes per minute (see next chapter).

It is also possible to start slowly with a non legato, using less arm weight and a "hanging hand" (p.8), still keeping the finger strokes high and vigorous. This will lift off into a mezzo staccato, which will in turn merge back into a non legato at very high speed. The touch can be maintained as a non legato by applying more arm weight (see below), to counteract the "lifting off". Traditionally, it has been common practice when playing a slow non legato to use a poised arm with the hand held up horizontally. However, as stated on p.8, this causes tension in the wrists, forearm and elbow, and does not serve any musical purpose. For this reason it is better to do the slow practise in a legato, allowing it to change into a non legato at higher speed.

The held and free exercises based on particular chords lead to the corresponding scales or arpeggios. Free exercises yield their maximum benefit when played fast and loud. They should be speeded up to a point where they become difficult, then gradually increased beyond that. Unless we push the limits, we are not moving forward. Nevertheless we should also play exercises for a prolonged period at a fast but comfortable speed, in order to build strength and endurance. This is analogous to the singer, who can increase her range of high notes, not by constantly singing at high pitch, but by spending many hours working on notes in the medium range. We practise exercises with alternate hands at each speed, so as to rest one hand while the other plays. Many exercises do not need to be played with the hands together. Whilst each exercise should be practised thoroughly, it is better not to fall in to the habit of working on just the same few exercises for a prolonged period. Here the law of diminishing returns applies, so that the benefits of working on one exercise for a very long time (months or years for example) will gradually decrease.

Some general issues concerning exercises are listed here:

Based on the principle stated on p.5 that each finger reacts against the weight resting on the previous finger, we need at least two fingers in order to make an exercise. Single fingers can be exercised if other notes are held down, as in the held exercise, since they can react against the weight resting on the held notes.

Exercises which share the work between many fingers (as in Hanon, p.59) give less work to each finger, and are less effective from an endurance standpoint, although they may be valuable as regards co-ordination.

The thumb is not very suitable for exercising in terms of vertical movement, as it tends to be too loud. It is

very suitable for work involving *lateral* movement (See exercise 3 at the end of the guide).

Alternating between adjacent fingers (2+3, 3+4, 4+5) is especially helpful. Non-adjacent pairs tend to be fairly independent already, and less in need of exercise. However, if this regime is adopted, the 3rd and 4th fingers will receive twice as much exercise as the 2nd and 4th. Even so, it is good to work on the 3rd and 4th at least sometimes, as this combination is especially problematic in terms of independence.

The 4th and 5th fingers will not be able to play as fast, loud or for as long as the others. For this reason they should be exercised more frequently, in short bursts with rest periods in between.

Double-note exercises (i.e. where two notes are played at once by the same hand) are particularly good for co-ordination and for developing stretch between the fingers. Numerous examples are given in exercise 5 at the end of the book.

Working away from the piano against a resistance in the form of weight or elastic resistance (p.43), although not yet widely recognized, is a very concentrated and effective way of developing strength.

As Neuhaus says, in The Art of Piano Playing, the fingers are our soldiers at the front line, whilst arm movements and arm weight are the back-up team. The latter are of no value unless the "soldiers" are properly trained, in this case with finger exercises. A large selection of these can be found from p.60 onwards. Sources of other exercises can be found on page 59.

Legato and Non Legato

There is some confusion of terminology here. The term ***non legato*** is associated with a detached or articulated style typical of the raised finger school. However, it is also sometimes (although not in this guide) used to refer to the Russian "whole arm" method, whereby the arm is dropped on to the keys at the beginning of a phrase (see p.5 and 35). ***Legato*** (literally "bound" or "joined" notes) means, of course that the notes are connected seamlessly in a smooth progression. This is the "default" touch of the arm weight school. In my view, a balanced technique should include both of these touches, with legato predominating at lower speeds and non legato being the natural touch for faster passages.

The term ***non legato*** implies a very brief silence between each note. It is analogous to tonguing on a wind instrument or playing with separate bows on a stringed instrument. It comes about as a natural result of lifting the fingers high, unlike staccato, where the notes are deliberately shortened. Passages played non legato will sound clear and highly articulated at speed. There are many grades of non legato, ranging from a hair's breadth of silence to something approaching a mezzo staccato.

In ***legato*** playing, each note is immediately followed by the next, with no silence in between. This is similar to the singing voice, or to slurred playing on a wind or stringed instrument, and is suitable for playing melodies. It is not suitable for rapid passagework as it lacks articulation. However, it is perfectly viable, indeed preferable, to *practise* passagework slowly in a legato touch, using arm weight and a strong raised finger action, afterwards speeding it up with a metronome. As stated above the touch will "lift off" at high speed into a non legato. Slow practice in a legato gives the fingers even more exercise than non legato, where the fingers are assisted by the dropping of the arm during the silence between the notes. In addition, a non legato played slowly has an awkward, lurching feeling, like trying to run very slowly.

The physical mechanisms for playing legato and non legato are fundamentally different. In legato playing the sounding of the tone is accompanied by a brief bobbing ***up and down*** of the arm, after which the note is held in a low position, shown by the broken pink line in the first diagram on page 14. In non legato, the tone is sounded by a swift upward movement and then held in the high position, shown by the solid blue line. The arm then bobs briefly ***down and up*** during the silence between the notes.

The most natural touch for rapid piano playing is non legato. This can easily be established by seizing any uneducated member of the general public and obliging them to play a few quick notes. When the fingers are

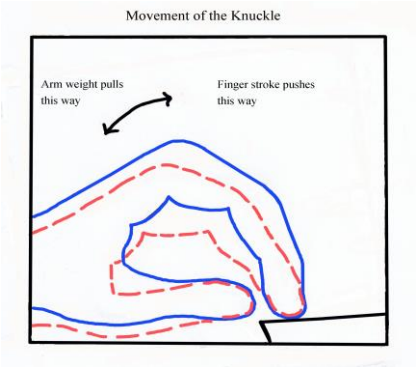
lifted high, their natural alternation results in a brief silence between the notes. There is no point in forcing oneself to play rapid passages in a legato, as it merely reduces clarity and articulation. Many concert pianists play non legato most of the time, sustaining the notes where necessary with the damper pedal, and playing legato only in passages where pedalling is impossible, for example when one hand has a smooth melody against a staccato accompaniment in the other hand. It may be asked: "Why play non legato if you are going to convert it into legato using the pedal?" The answer is that non legato is the most natural and efficient touch at high speed. To play legato we would have to add more arm weight, which would increase fatigue.

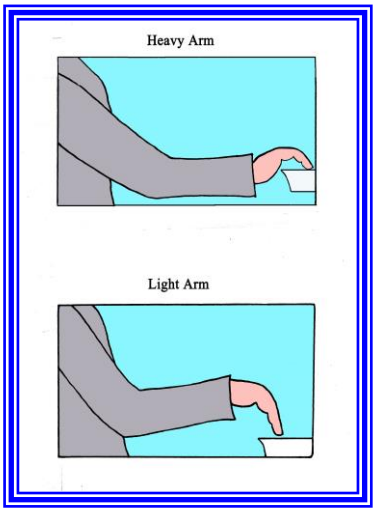
In fairly rapid performance a heavy legato touch can be cumbersome, as the fingers feel "tied down" to the keys. When playing with a light non legato, the fingers feel as though they are dancing upon the keys, as opposed to crawling along them in the case of legato. In passages with wide intervals between the notes, arpeggios for example, non legato is more agile, as the hand can skip to an extent across the gaps during the silences between the notes, instead of stretching from key to key. In this way, the hand can be much more relaxed. However, for lyrical pieces at a slower tempo, the legato can achieve a more penetrating tone and greater power of expression. Where a cantabile melody is played by the right hand with a more rapid flowing accompaniment in the left, the right hand can be played legato with arm weight and the left hand may use a quiet non legato (*leggiero*) with a hanging hand (see p.8).

In practising both touches, we lift the fingers high. This allows them sufficient distance in which to accelerate, giving greater power, and at speed enhances articulation by creating a short silence between the notes. It also helps the unused fingers to avoid becoming entangled amongst the black keys. On the other hand, when taken to excess, it reduces power by forcing the descending fingers to fight against the upward stretch of the unused fingers, as though in a tug of war. It also causes tension and discomfort, which distract the player from the fundamental task of interpreting the music.

The role of arm weight

The natural action of arm weight is to pull the hand not only downwards but also backwards, towards the player, as the upper arms try to fall back to a vertical position. The wrist is drawn down so that the hand rolls back, resting on the fleshy part of the finger end, rather than the very tip. To counteract this rolling and the backward pull, the fingertip contracts, pulling the key as though trying to "walk" forwards. This creates a dynamic equilibrium, just as when a dog walks forwards whilst its owner restrains it by pulling at the leash. The finger drags rather than stabs the key. We can imagine ourselves hanging from the edge of a skyscraper whilst clinging to the roof with the fingertips. The finger pushes the arm upwards and forwards at the knuckle, again to counteract the downward and backward roll of the hand.





The knuckle moves in an arc, pivoted at the fingertip (see diagram 1 above). The wrist obediently follows in the same direction, but we should think of the action as occurring at the knuckle, as this is where we execute individual finger movements, as opposed to whole hand movements from the wrist. Hand movements undermine the independence of the fingers, as all the fingers are moved at the same time. Nevertheless the wrist must follow the upward trend, so that the forearm and hand are kept in a relatively straight alignment,

supporting the weight of the arm but *without arching the wrist*.

In order to avoid arching, we relax the wrist down, so that the muscles which would raise it are not used. It is not held down in an exaggerated or rigid way, and not when playing lightly (see below). However, we must avoid the amateurish practice of sounding the notes with a *downward* arm and wrist movement. The latter should only be used for the very first note of a phrase (see p.35). We can also move the wrist up and down in a flexible way whilst retaining a constant level of arm weight. This does not take place on each individual note, but over a period of several notes, and is completely independent of the finger action. This flexibility makes it easier to navigate around the keyboard when playing groups of black and white keys. The wrist can be low or high when using arm weight, as the hand is supported by the keys, but when playing lightly it is almost always high, with the hand hanging down loosely (see p.8).

Some proponents of "arm weight and relaxation" speak of transferring the whole weight of the arm from key to key, regardless of dynamics and speed. If we allow the whole weight of the arm to rest on the fingers, this will impose a crushing burden upon them, rather like running with a sack of coal on one's back, and will also impede the arm movements described on page 6. Touches such as non legato and finger staccato will be impossible, as these require the arm to support itself during the silences between the notes. Therefore, the action of the arm muscles is to lift *some* of that weight out.

In order to experience the sensation of introducing arm weight, the following exercise is useful. Rest any finger lightly on a depressed key with the arm poised and the hand hanging loosely. Gradually add arm weight, not by pushing forward into the key, but by rolling the hand backwards as the wrist lowers and feeling the increasing pressure on the fingertip. A gentle bending sensation is felt in the elbow. We are now resting not on the tip but on the fleshy part of the finger end, which pulls the keys towards us in order to support the weight. The hand is now hanging from the key rather as a cable car hangs from its wire. It feels like "strap-hanging" on a tube train. The arm is suspended like a hammock between the finger end and shoulder. Now gradually remove the weight by raising the wrist and allowing the hand to hang the other way again. Repeat the whole exercise with each finger. Then practise simple exercises such as Hanon, using the heavy, rolled back position for loud playing and the light hanging position for a quiet sound. Also add crescendi and diminuendi by gradually rolling the hand down and up.

When using weight, the fingers cling to the keys in order to prevent the hand from being pulled off the keyboard by the arm weight. The keys support the hand in a roughly horizontal position. When playing lightly, this support is absent. The hand should not be artificially held up by using the muscles on the upper side of the forearm, but allowed to hang loosely. (See right hand picture above, and also p.8). To test this, hold out the left forearm horizontally and allow the right hand to hang from it by the fingertips, with a low wrist, as described above. Then suddenly remove the left arm. The right hand should immediately drop so that the fingertips are now in a low position.

Resting arm weight on the key bed

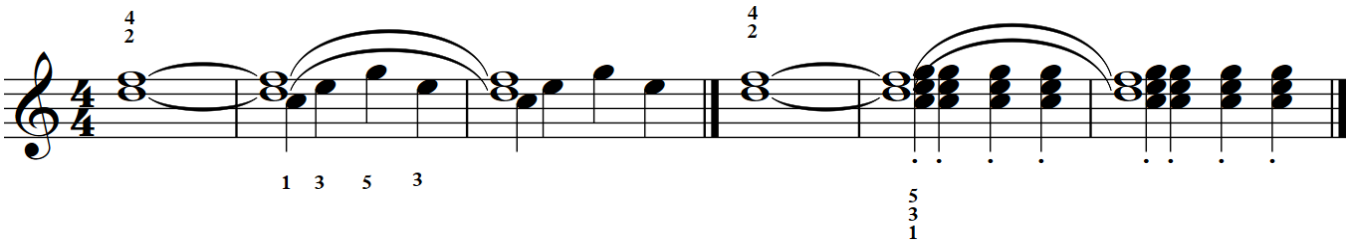
This is a hotly debated subject. Matthay's view (p.59) was that the keys should be held down with the minimum of arm weight, which is on average about 60 grams for a grand piano, with the arms almost completely "poised". Advocates of arm weight transfer (p.22) believe the opposite. My advice, lying somewhere between the two extremes, would be: "Rest the arms lightly on the keys". It should be pointed out, however, that even by resting "the full weight of the arm", we are in fact only resting a portion of it, as the other half is supported by the torso, hinged at the shoulder. This can readily be established by sawing off a human arm and placing it on a weighing scale. It weighs exactly 3.216 Kg. (depending on whose arm is used.) A less painful method would be to weigh a brick in its entirety, then re-weigh it, placing one end on the edge of another brick, and the other end on the scale. The new reading will be much lower than the previous one. A problem in the teaching of arm weight is that it is impossible to see how much weight someone is using. This can be solved by "playing" on the top of a simple kitchen weighing scale. This may seem a quaint solution, but it is far better than saying "Never use weight" or "Use the whole weight of your arm." That would be as good as a recipe which said "Don't add any sugar" or "Add as much sugar as possible!"

16.
If we place the palm of our hand on the scale and allow the "whole weight" (i.e. available weight) of the arm to rest on it, the weight will be roughly 2.4 Kg. If we place one finger on the scale and roll back the hand so as to engage arm weight, the maximum weight which the finger can comfortably bear will be about 600 grams, i.e. a quarter of the available weight. The optimum amount of resting weight to use when practising would be about 300-400 grams. The louder and/or faster the music, the greater the amount of resting weight. It is significantly more than the minimal weight specified by Matthay, for the following reasons:

Firstly, most of the tone is produced by the finger stroke ***reacting against*** the weight of the arm, producing a sudden "spike" of weight (see p.20). Therefore the weight needs to be there in the first place, and the most convenient place where it can be is resting on the previous key. It is true that the finger can also react against a completely poised arm, by lifting it above the poised level, but this does not provide much power, particularly at higher speeds, although it is used in *leggiero* playing. It may be asked "How can the resting weight act on the new finger if it is already supported by the previous one?" Again, the answer lies in the physical position of the arm. The new finger *lifts* it to a higher level than the one where it is resting. In addition, the previous finger releases the weight.

Secondly, a heavier arm (but not too heavy) bounces better off the key bed, (see below), just as a pebble bounces better than a feather. This assumes a strong, rapid finger stroke.

Lastly, in non legato playing, we drop (rather than transfer) the weight on to the next note, so, as stated above, the weight needs to be there in the first place.



To prove that the fingers need resting weight against which to react, play the above example with a strong tone, and using only finger movements, not arm or wrist movements. In the first part, played *legato*, Matthay would argue that the sustained notes should be held very lightly, so that the arm's weight can be applied to the melody notes (CEGE). Each melody note reacts against the weight resting on the previous melody note. However, if we rest a moderate amount of weight on the sustained notes, the melody notes will be stronger than before, and the whole thing will feel much more comfortable. The melody fingers are reacting against both the weight resting on the previous melody note and also the weight resting on the sustained notes.

In the second part, with *staccato* chords, holding the sustained notes lightly will make it almost impossible to achieve a strong tone on the staccato chords. This is because staccato notes have no resting weight, as the fingers do not rest on the keys. Therefore, we need to rest all the weight on the *sustained* notes! This will probably surprise many people. By using resting weight in this way, we can provide a strong tone on the staccato chords. This technique can be applied using exercise 8b.

There are two ways in which to rest weight on the keys, namely, by pushing forwards (not recommended) and by pulling backwards (recommended). If we were to roll the hand forwards so as to "stand" upon the fingers like pillars, each finger could bear rather more resting weight than by pulling backwards. However, in this position the ability of the fingers to move freely and to react against the weight is greatly reduced, so that we would be using more weight to less effect. Therefore it is better to hang back rather than press forward. This can be proved by playing five adjacent notes rapidly up and down in each of the two positions. In the rolled back position with a low wrist, the volume and articulation are greatly enhanced.

Although we are only using at most a quarter of the available weight, it feels like quite a firm pressure on the fingertips, due to the fact that it is applied to such a small surface area. Experienced players and those with naturally strong fingers will be able to support more weight. **It should be stressed that using a great deal**

of arm weight in conjunction with a very strong finger action is high impact work, which should be approached carefully. A moderate amount of weight with a comfortably high finger action is sufficient. It should be added that, as seen in paragraph 5 on page 5, increasing the speed of the finger stroke is a more effective way of achieving a strong tone than using excessive weight.

We should think of the fingers as the only active members, with the hand and wrist free and flexible but not actively participating. As stated earlier, movements of the whole hand from the wrist undermine finger independence, and should be avoided. If we imagine that the finger, from its tip all the way to the wrist, is a train, then the fingertip is the engine, pulling the train over a hill. We can also think of the knuckle and finger joints as supporting the resting arm weight. This shifts the attention forwards, away from the wrist. Above all, we should be aware of the amount of pressure on the fingertip itself.

After the initial exertion of sounding the note, the finger immediately rebounds from the key bed. In response to this, the finger muscles, knuckles and wrist automatically relax from their exertion and the arm drops back down. After this the fingertip falls back from its rebound and rests on the keys with the "resting weight" specified above. This falling back prevents the keys from rising to the point where the dampers would cut in. As already stated, the rebound and falling back occur on a microscopic scale. If you do not experience any rebound at all, this means that you are using a lot of arm weight and a slow finger stroke. That is acceptable for performing smooth, quiet passages, but is not suitable for practising passagework.

During all these events the upper arm muscles are constantly supporting the other three-quarters of the arm's weight, so that the resting weight which falls back on to the new note will be exactly the same as on the previous note. This is an automatic factor which can be completely ignored. A good way of thinking about slow practice is to consider that some of the arm's weight has *already* been withheld by the arm muscles and can be forgotten about, whilst the remaining weight is resting on the fingertip. In legato playing it is then picked up by the next finger, or in non legato dropped on to it during the brief silence between the notes.

Matthay's idea that the weight should be *deliberately* lifted out immediately after the tone has sounded has left people perplexed as to how to do it. In fact, this happens automatically, for the following reasons: Firstly, most of the weight is delivered by the finger stroke which reacts against the mass of the arm and transmits it to the key. Once the finger has completed its stroke the pressure is released.

Secondly, like any object thrown at a surface, the finger and key bounce off immediately. This event triggers the release of muscular action by the finger and wrist, as explained above.

In other words, the whole process of immediate cessation of pressure and re-absorbtion of weight by the arm is something we should *allow* to happen rather than inducing deliberately. Nevertheless, we should not stifle these processes by holding the arm stiffly. The following exercise aims to avoid this problem:

Place a finger lightly on a depressed key, and add a moderate amount of arm weight by rolling the wrist back slightly. Strike a key firmly with the next finger. Allow the finger to bounce off the key, then fall back on, reinstating the resting weight, which remains constant. This will cause the note to be sounded twice in quick succession.

Repeat the "double hits" with each finger in turn, playing five notes up and down, very slowly. Gradually increase the speed. At about 200 notes per minute, the notes will not be repeated, as the next finger will begin its stroke before the first one has time to fall back on to the key. The result will be a passage of mezzo-staccato notes, bouncing from one key to the next.

One misapplication of Matthay's theory is the idea of trying to "put the brakes on the finger action" in order to avoid pressing into the key after the tone has sounded. If we allow the finger stroke to follow through naturally, like that of a tennis player, it will bounce better, so our work will be done automatically. Matthay's invention of the "sin" of "key-bedding" has led to paranoia about resting weight on the keys. The important thing is that the weight should be rested by "hanging" from the fingertip, with the wrist relaxed

and low, and a gentle feeling of bending in the elbow. The fingertips pull gently at the key. The relaxed arm is suspended between the fingertip and the shoulder joint. The “sin” arises when we push forward into the keys by straightening the elbows and locking the wrists. Fear of “key-bedding” has denied many people one of the fundamental tools of piano technique. With no resting weight, their fingers have nothing to react against, so that they will never achieve any power of tone.

As soon as the arm is lifted from the keys, the hand should hang loosely down from the wrist again. It should not be held up artificially by the muscles on the upper side of the forearm, as this causes stiffness.

In ***non legato*** playing, the finger begins to lift before the next finger reaches its key, so that the arm is unsupported for a moment. In response to this, the arm drops slightly, only to be borne up again by the next finger. This dropping gives added force to the finger stroke. It feels like an aircraft passing through an air pocket, when the support of the air is suddenly absent, but is then immediately reinstated. We can also think of wheeling a trolley across a tiled floor. The wheels bob down briefly into the joins between the tiles. This can first be practised by playing repeated notes with one finger, dropping the arm between each note. The dropping and picking up is very sudden, like the click of a camera shutter. The greater the resting weight, the more sudden the transition, as the heavy arm drops faster, requiring a more rapid pick - up. The dropping should be done only just before the next note, just as, when jumping, we bob down immediately before the jump, not a long time before.

The dropping is absent in legato playing. Here, the arm is supported by the finger and is then driven upwards by the stroke of the next finger. It immediately falls back on the rebound, and remains in the resting position. In this sense it is closer to a “pure” finger touch. As stated on page 13, in slow ***legato*** practice, the “default” position of the knuckle and wrist is “low”. They bob *up and down* momentarily as the key is struck. The default position in a slow ***non legato*** is “high”. They bob *down and up* briefly during the silence between the notes. Nevertheless, in both cases the tone is sounded by a swift upward and forward movement of the knuckle, and in both cases the arm always pulls down and backwards. The difference between “low” and “high” is on very small scale, and should not be exaggerated! It is also an entirely passive response to the finger stroke, and not a deliberately induced action.

In the graphs on p.20, the horizontal lines represent resting weight, whilst the spikes show the weight added by the finger stroke. This additional “weight” is really *kinetic energy* or *pressure.* The small dip, after the spike, is the moment when the finger has bounced off the key, and before the resting weight is reinstated. For slow *non legato* playing, there would be an additional small trough *before* each spike, representing the brief silence between the notes. In the first diagram, both the resting weight and the strength of the finger stroke increase with volume. In the second picture, the resting weight disappears in rapid playing, as we are no longer sustaining the tones. The weight is simply bounced from one finger to the next.

By resting some weight on the key we allow the upper arm and back to relax. On the other hand, it places more strain on the finger muscles, situated below the forearm. This means that, in slow playing, one finger has to bear a heavy weight for a prolonged period, resulting in fatigue and discomfort. This is why we lift out the weight when playing very long notes. The muscles of the shoulder and upper arm are working whilst those of the lower forearm and hand are relaxed, and vice versa, as the upper arm takes turns with the fingers and hand in supporting the arm weight. This alternation can be practised by rolling the hand back and forth whilst resting one or more fingertips on the key bed or on any firm surface such as a table top. It is also interesting to place a finger on the top of a weighing scale, and observe a regular alternation from almost zero up to about half a kilogram.

The arm can work in two different ways. It can be actively involved in sounding each note by adding and removing weight (wing action, p.33), when playing chords, octaves or accented notes, or it can simply rest part of its weight on the key beds, when playing passagework. Often however, the two occur together, as most music consists of a complex mixture of all the above features.

When gradually speeding up a passage we usually begin in a legato touch at roughly 66 notes per minute,

resting weight on the key beds. However, from about 280 notes per minute, the arm no longer rests on the key beds, but begins to bounce off, just as when someone walking increases their pace and finally breaks into a run. This causes the touch to change to a non legato. At around 400 notes per minute the bouncing merges back into a feeling continuous arm weight. The sensation of separate impulses of energy merges, just as the separate frames of a film merge into a continuous moving picture. This is simply because our brain is unable to perceive separate events occurring in very rapid succession. In the same way, the finger stroke pushes the knuckle up and forwards in slow playing, but at high speed the separate knuckle movements merge into a sensation of continuous gentle arching of the hand. This implies a mild tension in the hand which is perfectly acceptable, and serves to counterbalance the downward and backward pull of arm weight. It is not a "pre-set" tension, but a response to the arm weight, and must be maintained, especially at the outer side of the hand (4^{th} and 5^{th} fingers) in order to assure an even tone. The transitions between these different touches are not sudden, as there is a considerable area of overlap where the touch can be made more or less sustained by adding or reducing weight.

In a rapid non legato, the bounce of the arm is a soft one, cushioned by the elasticity of the whole muscular apparatus, much as the leg muscles and soft shoes cushion the landing of our feet when running. The weight does not make a hard landing on the key, but is gradually added and then taken away, which accounts for the slightly rounded profile in the last graph on p.20. The "gradualness", however, is purely unconscious.

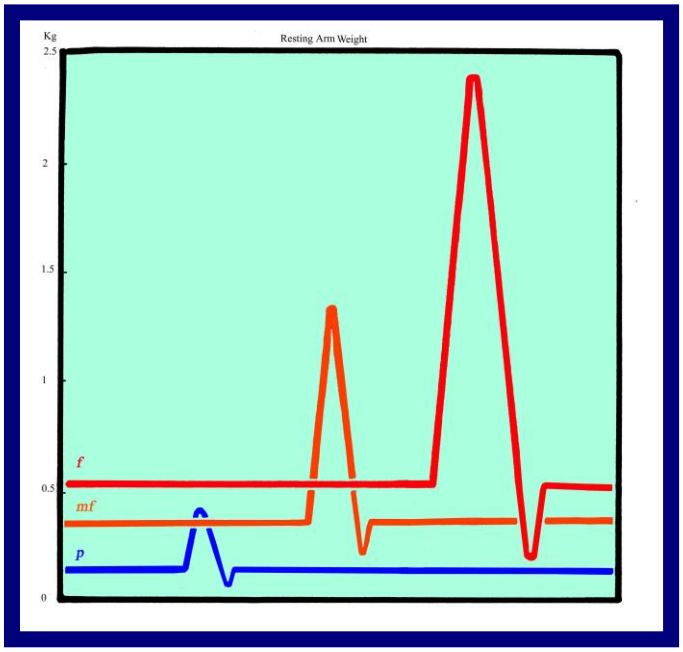
When playing a melody, there are two alternatives. Normally we use a legato finger touch with resting weight, literally "hanging off" the long notes. This gives a good deal of "lower noise" caused by the key hitting the key bed forcibly (see p. 26). The latter consists of a wooden beam with thick felt washers beneath each key. Alternatively, we can use an arm action ("wing action", p.33) with little finger movement, lifting the weight out immediately after the tone by tugging back the arm at the sounding point of the note, when the hammer leaves the escapement, and before the key reaches its base. In this way a powerful tone can be achieved with less lower noise and less jarring upon the fingers. It is helpful to think of "lifting the sound out of the keys". In more rapid playing, using the arm action tends to highlight each individual note, giving a more forceful, vehement, declamatory effect. The words "pesante" and "leggiero" aptly characterize the touches with and without resting weight, both from a physical and expressive standpoint.

When the finger reacts against a heavy arm, it transmits more force to the key, hence the amount of resting weight depends on the dynamic as shown in the first graph. The figures are very approximate, as any instance of ***p***, ***mf*** or ***f*** is different. It will be noticed in the graphs below that the amount of resting weight is very small (the highest being 500 grams) in comparison with the additional weight delivered by the finger stroke (up to 1½ Kg.). Not only the resting weight but also the strength of the finger stroke increases at a higher volume. The finger stroke and arm weight balance each other. A light weight can be delivered by a relatively small stroke, whereas a heavy weight can only be supported and transmitted by a powerful stroke. In the same way, a very large electrical impulse can only be transmitted by a powerful fuse wire.

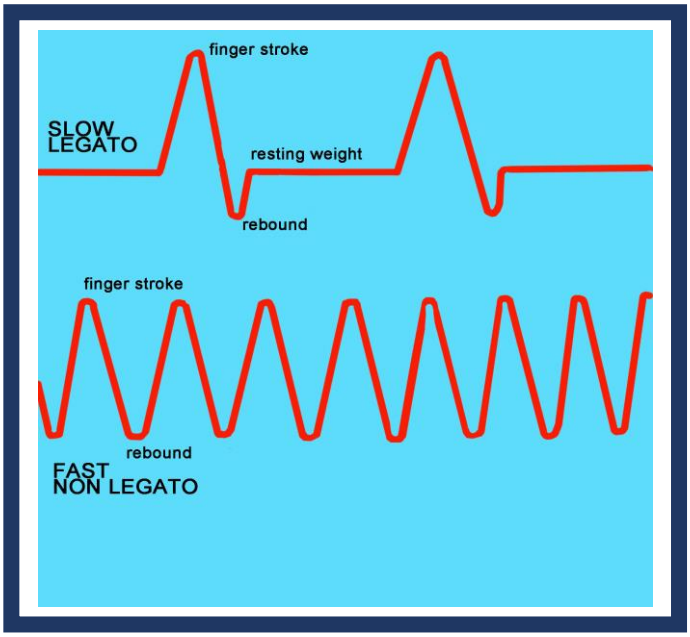
The proportions of finger strength and arm weight also vary according to the articulation required. The stronger the finger action and the lighter the arm weight, the more detached the notes will be. Increasing the speed also makes the touch more detached. This is why, if we play rapidly using a very light arm, we can achieve a non legato touch even without energetically lifting the fingers. (See next chapter).

When playing a melody with groups of quicker notes interspersed with long notes, we can introduce weight by means of a downward wrist movement at the beginning of the quicker phrase, and lift it out again by using an upward wrist movement at the beginning of the longer note. If the note is not very long, for example a quaver among semiquavers, it is better to "hang" the weight off the long note, so it is then available for playing the next note. In the music of J.S. Bach, we can come off the last semiquaver with an accented staccato and play the remaining quavers with either a finger staccato (p.29) or a "wing action arm staccato" (p.26). We then introduce weight at the beginning of the next group of semiquavers and play these with a finger action, legato in slow speed, non legato at higher speed. The finger staccato combines easily with the legato or non legato. The arm action is more difficult but merrier and more vigorous. In general terms, the semiquavers are played with a low wrist, the quavers with a higher wrist.

20. **Arm Weight and Volume in Slow Tempo (legato)**



Arm weight and speed



Practising rapid passagework

Extended sections of rapid passagework, found in Chopin or Czerny studies, for example, should be *practised* with a strong finger action and moderately high resting weight, as described on page 5. We need strong fingers in order to play fast. It is a matter of "power to weight ratio", as the muscles not only have to move the fingers up and down but also to work against the opposing forces of arm weight and key resistance. If they are struggling to do this, their speed of movement will be greatly reduced. Pianists who fail to appreciate this are as good as athletes who train for the Olympics by watching it on television. In fact, the well-known misconception associated with the arm weight school of "letting gravity do the work" could well be exemplified by the image of a runner with a heavy body and weak legs. It should be added that in rapid playing each finger has to repeat its action much more frequently, resulting in increased fatigue (p.52).

However, rapid passagework will often be *performed* with either a reduced finger action or reduced weight, or both, in order to minimize fatigue. An important general principle in physical training is that the body should become accustomed to working *beyond* the level required in performance, so that the technical

demands will then seem so effortless that we can focus entirely upon the musical message. The lifting muscles (extensors) tire first, giving a burning sensation on the upper side of the forearms, which is acceptable in practice but not very desirable in performance.

Playing with a reduced finger action may prove difficult to people who have only ever practised with strongly raised fingers. Therefore, in the later stages of learning a piece, we can speed up the passage in the following way: A significant amount of arm weight is still used, as well as a sudden, rapid, decisive finger action and firm tone. A rounded hand position is still maintained, with no sagging towards the little finger. However, instead of lifting the fingers high, we start from the surface of the keys, "preparing" the notes which are about to be played by placing the fingertips on their surface. We aim to generate as fast, powerful and incisive a finger stroke as possible within this limited distance. Play with a legato touch, making sure that each note is clear and that a constant thread of tone is maintained as the speed increases, but without deliberately lifting the fingers high. A good deal of continuous arm weight will be required at higher speeds. This makes life difficult for the fingers, which are supporting a heavy weight without the advantage of lift.

This process only needs to be done with whichever hand is playing the rapid notes, and not to excess. Like its opposite, it takes us beyond the requirements of performance. We can now return to a comfortable middle position, with moderate weight and moderate lift. In doing this form of practice we are sacrificing something in terms of articulation, volume and incisiveness of touch, but gaining in terms of speed. Lifting the fingers very high slows us down, as they have to travel further, which of course takes longer and requires more effort. The notes will be less detached, but this is not very important in Chopin or Ravel, as the articulation is in any case lost through continuous pedalling. It becomes an issue in the case of Bach or Mozart, however. Fortunately, their music does not normally require extremes of speed or endurance, so we can continue lifting the fingers high in performance.

A completely different, almost opposite approach is to keep the lifted finger action but take away almost all the arm weight, playing with a *leggiero* touch, using a hanging hand. As the fingers are no longer supporting weight, they can be released into a less strongly curved shape, which renders them more agile. The touch is more articulated (detached) as the fingertips can be lifted higher above the keys. Double note passages require more weight to balance the upthrust of two keys. Also, two fingers can bear more weight than one.

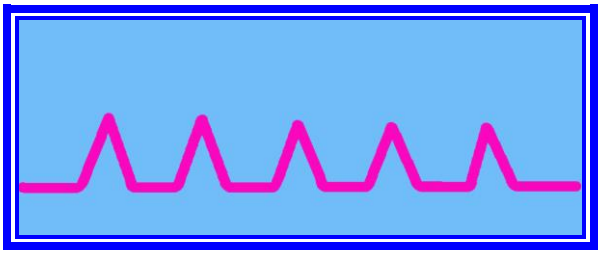
To establish the leggiero touch in slow practice, play five adjacent keys up and down repeatedly with minimal weight, then gradually roll back the hand slightly, allowing weight to sink in to the point where the touch is just beginning to feel firm. In this very light environment the fingers strive to make an impact, biting into the keys like small axes. We should also *practise* the passagework using the leggiero touch from the lowest speed, using a non legato with a strong finger action but minimal weight, and a hanging hand. A greater strain will be felt in the upper arms and back, particularly at low speed, as the keys are no longer supporting the weight. At a higher speed the "cyclic" finger action as shown in the last diagram on p.7 can become more pronounced, with the fingers beginning to bend about half or two thirds of the way down, stroking the keys backwards and continuing to bend as they retract. Using the small muscles in this way can take some of the strain off the larger muscles which move the fingers from the knuckle.

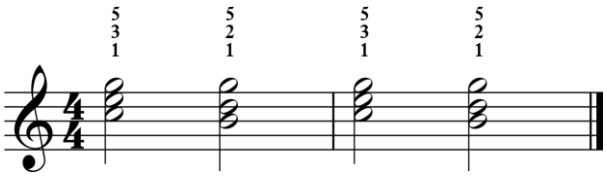
Mixing the close finger touch and the leggiero touch within one piece will add variety to the performance. The close position gives a smooth, rounded tone whereas the leggiero touch creates a light, feathery effect. An even more relaxed option is to use minimal finger lift *and* minimal weight, just enough to sound the notes clearly. The hand is partially hanging, partially supported by the keys. The fingertips gently stroke the keys towards the player. There is not a lot of point in doing this very slowly. Begin at about 4 x 60 in a legato touch, playing quietly but making sure all the notes sound. The touch begins to lift off into a non legato at roughly 8 x 76. Gradually increase to maximum speed, then play the whole piece rapidly many times in order to build stamina. (See exercise 2c). ***With high speed and a light arm, a clear non legato can be achieved without expending energy on lifting the fingers very high.***

If the music contains passages which are both fast and *loud*, there will be no advantage in reducing the height of the finger strokes in performance. This is because the speed of the finger stroke is a major factor in

generating volume of tone (see p.5). In order to reach the same speed by the time the tone is sounded, the finger muscles will need to work much harder if they have less distance over which to accelerate.

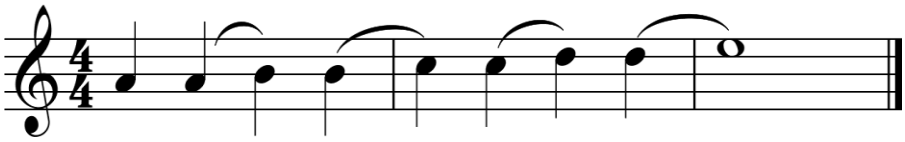
Arm weight transfer touch





This concept, which is an important foundation of good technique, acquired a bad name through its association with the arm weight school. They envisaged weight being passed gently from finger to finger, with the fingers being passive recipients of the weight. "Gravity" was said to be doing the work *instead* of the fingers, rather than in partnership with them, so that finger action was minimised. In this form, it is contrary to the central theme of this guide, namely, that the *finger stroke* produces the tone, by reacting *against* the arm's weight, which is resting upon the previous key. When seen in this new context, arm weight transfer is an essential prerequisite of the reactive process described on p.5.

Gravity does not make life easier for the fingers. On the contrary, the more weight we use, the stronger the fingers must be to balance it. Each finger *lifts* the arm off the previous finger, thereby bringing its weight to bear on the next key. This is not a seamless process, as there is a momentary bobbing up and down of the arm coupled with a rebound of the key (p.13-19). Nevertheless, these "transition" events are brief, involuntary and on a minute scale, so that slow legato practice as well as in rapid playing, we feel that the arm is being continuously supported by the finger until the next finger comes to "react" against it. Having established a certain level of "resting weight" (p.15) within a phrase, there is no conscious lifting off of weight by the arm muscles until the end of the phrase. Therefore, there should be at least one finger supporting the weight until it is reacted against by the next finger. Any finger which is *repeated* will be unable to support weight between the notes, therefore in slow practice we should determine which other fingers are available to do this. In the short passage above, the thumb and 5th finger are repeated, so the "transfer" occurs between the 2nd and 3rd fingers. The repeating fingers will be taken off the keys a little earlier than the "transferring fingers". Where staccato and legato notes are played by the same hand, weight is transferred between the legato notes, as this is clearly impossible between the staccato notes (ex. 8 d-f).



In the case of repeated notes in a single melodic line, there are no other fingers available to support the weight between the repeated notes, therefore the arm must be lifted off. The same is true when the stretch is too great to allow for arm weight transfer. The melody should therefore be divided into phrases, with the weight lifted out at the end of each phrase and reinstated at the beginning of the next, as shown above. It is helpful to draw phrase marks on the music when this occurs. When the arm is lifted, the hand is left "hanging" (p.35). When repeated notes occur at high speed, the first of the two repeated notes is played with an accented staccato, and the arm movement is greatly minimized.

From an expressive standpoint, whilst we are actually playing a series of separate notes, it is better to think instead of a continuous unbroken melodic line, or "thread of tone," just as singers do. This will be easier if we experience a continuous thread of arm weight being passed between the fingers. Similarly, when walking, we can focus on smooth forward motion rather than on individual footsteps, although this does not mean that we do not need to lift our feet up. Therefore arm weight transfer is a perfectly valid concept provided that it is combined with a strong finger action. When the finger stroke is weak it creates only a

small spike of energy, as seen in the graph above. However much weight is used, only a weak tone will be produced, as the volume of sound depends on a combination of weight and finger speed. As a result of the gentle finger action there is also no "bounce" or rebound from the key bed. If we place a ball on the ground, it will not bounce, whereas if we throw down the same ball, it will do so. Therefore, there is also no trough after the spike on the graph on p.22. (Compare the graphs on p.20.) There is also no trough before the spike, as the arm is not "dropped" as in non legato playing. The lack of tone can be put to advantage when a soft sound is required, as in quiet, even, legato accompaniments. The weight is passed discreetly from finger to finger, using the same action and with the same objective as when tiptoeing softly. Applying excessive weight, however, would be inappropriate, as this would be like using a steam roller to make pastry. Normally, quiet accompaniments are better played with a *light* arm and a hanging hand (see p.8).

Arm weight transfer touch with a gentle finger action is unsuitable for passagework, as the notes suffer from a lack of "attack", and also lack articulation, because the weak finger touch does not lift off into a non legato at high speed. The notes sound unintentional, as though played by accident. The percussive element in piano tone which helps to distinguish it from the sustained sounds of orchestral instruments in concerti will also be missing. A rapid non legato touch with raised fingers also gives a sensation of the arm being continuously supported, as it is "bounced" from key to key, with no voluntary lifting off of weight.

Some pianists are so obsessed with the idea of a continuous, unbroken thread of transferred weight that they avoid anything which would cause the arm to be lifted off, for example at the end of phrases or in staccato playing, thereby converting the music into something amorphous, featureless and devoid of expression.

Varieties of touch and dynamics using finger action and arm weight

In controlling volume and touch we have three parameters at our disposal, namely finger action, arm weight and arm movement. The last of these will be considered in a later chapter (p.33). Here, six possible combinations of finger action and arm weight are considered.

a) Minimal weight: Here the arm is actively lifting upwards and the fingers are as it were fighting to reach the keys. The hand should hang loosely. With **minimal finger movement** this gives the quietest touch of all and can be used for gentle legato playing, as in Debussy's Clair de Lune, for example. With a moderate non legato finger action combined with pedal it produces a "floating" effect ideal for gently flowing quavers in romantic music. Such music should initially be practised firmly and graded down later, as this instils the notes more securely into the memory. At high speed, the light arm produces a leggiero touch found in quiet yet sparkling passagework, for example in Chopin or Ravel. The finger movement and arm weight can be increased for louder passages. With **strong finger movement** and minimal arm weight, a very detached touch is obtained.

b) Medium weight: Here the arm rests just enough weight for the fingers to rebound comfortably from the key bed, i.e. about 300 grams. With **minimal finger movement** this is used for legato playing at medium volume, and is suitable for gentle, flowing, lyrical pieces. With **strong finger movement** it produces a non legato touch ideal for passagework in Mozart or J.S. Bach.

c) Heavier weight: Resting weight of about 400 grams combined with a strong, decisive finger action is the normal touch for practising all passagework. As the speed is increased, it forms a continuous "blanket" of weight which is needed in order to counteract the upthrust of the keys in rapid playing. At high speed it serves to maintain a firm non legato, as the touch would otherwise lift off into a feathery mezzo staccato.

Josef Gat in "The Technique of Piano Playing" (see p.59) explains this phenomenon in terms of the number of keys played per second. If we imagine that each key has a nominal weight of 60 grams, in slow tempo we may only play say two notes during a four second period, with an upthrust of 120 grams. In rapid tempo, we may play fifty notes during the same time frame, and our fingers find comfort beneath their "blanket" of arm weight as they grapple with a daunting upthrust of 3 Kilograms. One could say that the many little springs of upthrust form a "mattress of resistance" against the weight of the flexible blanket. This may sound fanciful, but it is the best way I can find to describe the sense of equilibrium which we aim to achieve. At very high

speeds, the fingers need to maintain firm contact with the keys in order to ensure a secure performance. Like a speeding vehicle, we need "enhanced road holding capability", and the weight provides this. When used with **minimal finger movement** at high speed, the 400 gram resting weight creates a warm legato. With **strong finger movement** it gives a powerful and brilliant non legato touch used in virtuoso passagework.

Playing in this way can easily lead to fatigue, especially in prolonged periods of continuous passagework such as we find in Czerny studies. In this case, we can divide the music into shorter phrases, beginning each phrase by dropping arm weight on to the first note with a downward wrist movement, and ending the phrase by lifting out the weight and allowing the hand to hang. The phrases can be gradually lengthened, until we are only taking a short break at the end of each page or musical paragraph. We can also use "adding notes", where we begin a passage with just one note, then the first two notes, then three, four notes and so on, so the phrase becomes longer each time. Each addition is played in the same way as in the method described above. In performance we reduce the amount of weight and the strength of finger action (see p.21).

When playing continuous passagework, as in some Baroque music, expressive crescendi and diminuendi can be introduced by increasing or decreasing the amount of arm weight by rocking the hand backwards or forwards. The three levels of arm weight described above can be practised by playing simple patterns such as CDEFGFEDC many times, or using Hanon studies (see p.59), varying the weight each time. For example, a phrase could be played twice with position (c), twice with (a), alternating, the quiet repeat being like an echo. Then, twice with (a), twice with (b), twice with (c) and back again.

Varying the strength of finger action

Finger action can be modified according to the expressive needs of the music. For extremely loud passages, or for a very detached, articulated sound, the finger action is emphasised. This produces an effect of vehement intensity in loud music, and of timidity in quiet passages. For cantabile melodies, arm movements ("wing action", see p.33) can be used, together with relaxed fingers which remain quite close to the keys. A powerful tone can be attained in this way without energetic finger work. A somewhat restrained finger action is used when performing passages requiring a great deal of endurance (but not when practising them), as it leaves some strength in reserve (p.21). Very gentle broken chord patterns used in accompaniments, or, for example, in Beethoven's so-called "Moonlight" Sonata, can be played in the following way: the fingers hardly move, remaining in contact with the keys. The wrist moves in circles, which tend to be anticlockwise for the right hand or clockwise for the left hand, irrespective of the direction of the melody. However, the hand remains horizontal in a lateral plane, and does *not* rock from side to side. Even in such an extreme case, the music should first be practised firmly, with raised fingers, as this instils the notes securely into the memory. In very quiet, furtive playing, we use minimal arm weight with a hanging hand. The fingers are still lifted high, but the down stroke is restrained. The "restraint" does not denote an abandonment of hand position or a relaxation of the fingers. They are raised high, but come down in a careful manner, as though "tiptoeing" on the keys.

Dynamics depend upon contrast. Your loud is as loud as your quiet is quiet. Practising at maximum volume is of great value from a technical standpoint, in building strong fingers and acquiring a sure knowledge of the notes, and should certainly be done, but it is also vehemently anti-musical. Audiences will be beguiled by soft tones, yet merely repelled by a show of force. People who have only practised loudly will find that, when they are obliged to play quietly, their touch will be uneven, sometimes missing notes, as their fingers have become desensitised. They should then devote a significant amount of time to practising quietly, preferably on a "loud" instrument, developing a feeling for the minimum effort needed to sound the tones. Playing at medium volume is easy, so we should devote ourselves to working on the extremes. Above all, we should avoid following the example of egotistical pianists whose sole aim is to play as loud and fast as possible. Nevertheless, quiet playing should come from discretion and restraint rather than from weakness.

Accents

For an accent to stand out, the surrounding notes need to be much quieter, therefore we use a fairly light arm, but with a level hand, as a hanging hand would not be able to deliver the accented notes. If we play a passage of even semiquavers, and wish to accent, say, the first of every four notes, we use a strong finger

stroke on the accented note. This drives the knuckles upwards, reacting against the weight of the semi-poised arm. In slow practice this may cause a "double bounce", which can be allowed to happen. The other notes are played with the same moderately light arm but with a much weaker finger action which fails to engage the weight. For a very strong accent we can add an upward *wrist* movement on the accented note, although this runs the risk of disturbing the rhythm as the note after the accent will be delayed until the wrist has fallen back down. The wrist accent works on the same principle as the finger accent, reacting against the arm's weight, but being a larger joint operated by a larger set of muscles, it delivers more power. For a particularly strident accent, even on a single note in passagework, it is possible to use a whole arm movement (wing action, p.33), again playing the unaccented notes with fingers only.

The accent can be further enhanced by playing only the accented notes, and "shadowing" the other notes, *i.e.* playing them on the surface of the keys, without sounding. Scales and passagework can be practised with accents every 3 or 4 beats, in order to obtain an even tone. All work with accents should be started very slowly and speeded up gradually with a metronome. It will be noticed that the fourth and fifth finger need more practice in bearing the force of an accent than do the other fingers. Some exercises are designed specifically to train these fingers (see exercise 7). Accenting of single notes in passagework is not very common in real music. One example would be the Rondoletto from Stravinsky's Serenade En La. A much more important use of accents is in emphasising melodic lines (see next section). For accents on isolated notes or chords, see page 36.

Emphasising melodic lines

This is perhaps the most vital aspect of piano playing, as it makes all the difference between a dead performance and one infused with life and beauty. It is achieved by applying a stronger finger stroke and more resting weight to each note of the melody, whilst executing the accompaniment with reduced action and less weight. Alternatively, arm movements may be used to emphasise the melody notes, especially if they form the upper notes of chords, or for very long notes, where resting weight would be uncomfortable. Where there are very big lateral stretches, requiring a straighter finger position, the arm action is also preferable. This is because the straighter fingers are unable to support a great deal of arm weight.

It is often the case that both melody and accompaniment notes occur in the same hand (usually the right), with the melody notes most commonly assigned to the third, fourth and fifth fingers. Special exercises should be used to develop these fingers (Ex. 7). In Exercise 4, the crotchets are played with a strong finger action and resting weight, whilst the other fingers "shy away" from the accompaniment notes, using a weak, shallow finger action and very little resting weight. The shallow touch fails to engage the weight resting on the sustained melody note. By resting the arm's weight on the melody notes we can lift it away from the accompaniment notes, just as one can stand on one leg in order to take weight off the other. The *deep* finger stroke cuts hard in to the key and continues to press into it, maintaining firm upward pressure on the knuckle, pushing the hand away from the keys so that they are slightly "out of reach" of the other fingers. Each finger playing a melody note reacts against the arm weight resting on the previous melody note, with the accompaniment fingers being, as it were, "bystanders" to the whole process. This technique can be practised using exercise 4, or Dohnanyi exercise 12 or Joseffy exercise 1 (see p.59).

This technique can be practised by playing the melody notes legato, ***f***, and the accompaniment notes *staccato*, ***pp***. The staccato notes are not bearing weight as they are not resting on the keys, so the full weight is borne by the melody notes. The same idea can occasionally be used in performance, as follows: Just as a quiet accompaniment sets off a relatively loud melodic line, so a detached accompaniment (non legato or staccato) sets off a smooth melody by contrast, as for example in the slow movements of Beethoven's Sonatas Op. 2 no. 2 and Op. 28. This effect could be likened to pizzicato 'celli. We can also use the technique of "shadowing" the accompaniment notes, as explained in the previous chapter. In doing so we are, of course, using zero resting weight for these notes. In addition, double note exercises should be practised, accenting either the upper or lower voice and playing the other voice quietly. In particular, it is advisable to emphasize the "outer" voice, played by the 3rd, 4th and 5th fingers. See exercise 5a.
When resting weight on a sustained note, we can either "deprive" the other notes in the same hand of the weight, as just explained, or, we can use it to *emphasize* the other notes, by allowing the fingers to react

against the weight by partially pushing it off the sustained note, although not sufficiently to cut the note off by engaging the dampers. The sustaining finger also "gives" slightly at the knuckle when the other notes are played, instead of continually pressing into the key as in paragraph 3 above. The difference between the two techniques lies in the relative strength and *depth* of the finger strokes used in playing either the melody or accompaniment notes. In a case where we want both the sustained note and the quicker notes to be strong, there is no virtue in trying to "withhold" weight from the sustained note in order to "donate" it to the quicker notes. This is very difficult to do, and achieves nothing, as explained on p.15. The quick notes will be stronger if we rest moderate weight on the sustained note.

The inward rotary movement which is part of the "wing action" (p.33) is at first difficult to apply to the fourth and fifth fingers, and should be practised using exercise 7. In cases where a singing melodic line is supported by an arpeggiated accompaniment, also in the right hand, as in Schubert's Impromptu Op. 90 no. 3, the melody notes are approached with a sudden outward rotary movement, which turns inward just as the note is sounded. The wrist moves diagonally upwards and right, glancing off in an arc to the left as the note is sounded. This is much easier than using resting weight on these long notes.

Where a melodic line is played in octaves or chords, it is often desirable to emphasize the top notes of the octaves or chords above the rest of the notes. In such cases, a stronger singing tone can be achieved with less effort by using an arm action ("wing action", p.33) than by finger work. This will normally create a non legato effect, which can then be sustained by means of the pedal. The top notes and melody lines should not, however, be emphasized so strongly that the beauty of the underlying harmonies is lost.

In order to achieve a beautiful melodic line, we should always have in mind the ideal of a "singing tone". The notion that this can be achieved by arm weight alone is contrary to the laws of nature (see p. 5). The most powerful singing tone is created using a legato touch with only moderate arm weight and very fast finger strokes with fairly well-raised fingers. There is a sensation of "lifting" the tone from the keys.

Contrapuntal music

Here, the same method outlined above is used to highlight a particular voice in a contrapuntal texture, with two or more voices occurring in one hand. A fundamental rule of counterpoint is rhythmic independence, so that one voice moves while another sustains a note. This gives rise to two possibilities:

Firstly, a loud note may be held whilst quicker notes are played quietly by the same hand, as explained in the previous chapter. The second possibility is more difficult. Here, a *quiet* note is held whilst quicker notes are played *loud* in the same hand. In this case the quiet note is played with an upward wrist movement and hanging hand, lifting weight away from the key, coupled with a slow, shallow finger stroke. For the loud notes we introduce arm weight by "dropping" the arm on to the first one and playing the others with arm weight and a strong finger action. There is no need to continue withholding weight from the long note once the tone has been sounded. In fact, by resting weight on it we can achieve greater volume on the quick notes, as explained in the previous chapter. The dropping and lifting out of weight is identical to the way in which we play phrases (p.35) Practising exercises designed in this way is one of the best means of achieving true finger independence. (Exercise 4 reverse option and exercise 6).

In some fugues, even the "quicker notes" are very slow! Here, it is sometimes preferable to use arm action rather than resting weight in order to emphasise the fugue subject, as it is uncomfortable and inefficient to rest weight on a finger for a long period of time.

Tone colour

The tone colour of a performance is of great importance in determining its appeal to the listener. It is a major factor in playing most instruments, and is the main focus in vocal training, yet many pianists fatalistically accept that it is beyond their control. Yet we can influence tone colour through a combination of touch, dynamics and pedalling, as well as by emphasizing different parts of the musical texture, for example the buzzing bass notes or bell-like upper register. Much that is said about the tone colour of particular pianists is probably spurious, as it depends to a large extent upon the instrument itself, the acoustics of the auditorium

and also upon recording techniques. As far as the *musical* component of the tone is concerned, the only relevant factor is the speed of key descent at the moment when the escapement action releases, which is about two thirds of the way down. This determines the volume of tone, which also affects the timbre. Quiet playing gives a more mellow sound whereas loud playing creates a brighter tone with more upper partials.

However, the *noise* component is more within our control. This constitutes a surprisingly large proportion of the overall sound, as anyone can discover by removing the action from their piano and using it as a "Dummy keyboard", or by playing on an electric keyboard which is switched off. Normally the noise is masked by the musical sound, but when the latter is absent it becomes clearly audible. It can be divided into high-pitched "upper noise" caused by the fingers (and sometimes the nails) striking the key surface, and lower-pitched "lower noise" (a dull thud) which happens when the keys land on the felt pads beneath them. The lower noise is considerably amplified by the body of the instrument.

Given that the force acting on the keys is a combination of weight and speed (see p.5), we can achieve the same amount of key speed, therefore volume of sound, either by using a rapid, high finger action with little weight, or a slower finger action close to the keys with a good deal of weight. The former will hit the keys surface hard, producing upper noise, and will then experience a braking action from the key, finally landing quite softly on the key bed (see p.19). The latter will have zero speed at the key surface, and will accelerate through the key's descent, landing hard on the key bed and producing lower noise. In other words, a light arm with raised finger action gives a bright tone, whereas arm weight with a close finger action gives a warm and mellow sound. This makes sense in musical terms, as we use raised fingers for sparkling passagework and arm weight for gentle melodies. The noise lacks the sustaining power of the string tone, and is mainly confined to the "starting transient" of the note. However, lower noise can be captured by the pedal, leading in fast playing to a continuous "roar" of background sound. Some people with find it unromantic to describe tone colour in terms of "noise", but it seems to be the only rational explanation.

Chords hit from above have a harsh sound due to the preponderance of upper noise. As regards other types of passage, the listener's perception is influenced, both in terms of tone colour and expression, by subtle gradations and fluctuations of dynamics, both in a linear (melodic) sense and vertically, within a texture. For example, a melody will be perceived to have a "singing tone" if the phrases have an expressive rise and fall of dynamics, and if the melody is played louder than the accompaniment. The best results are achieved intuitively, by imagining the effect which we wish to achieve, by striving for a "tonal ideal" and by experiencing a feeling of "empathy" with the instrument. A useful approach is to mentally "orchestrate" the texture, ascribing one phrase to the 'celli, another to woodwind and so on. In this context, a hammered touch with raised fingers is suggestive of percussion instruments, whereas a legato with fingers close to the keys is akin to slurred playing on wind or stringed instruments. Here, the musical concept leads and the technique falls automatically into line. As often happens in artistic matters, a coalition of instinct and intellect achieves the best result.

Staccato

If a piano key is allowed to rebound naturally from the key bed, without being held down, this will give the shortest possible note obtainable from the instrument. No amount of deliberate tugging away from the key will shorten the note any further than this, although it may create an illusion of doing so in the mind of the performer, who is confusing the physical sensation with the sound produced.

As seen on page 17, the key rebounds even in legato playing, but is not allowed to rise to the point where the dampers would cut in, as the arms falls back down, resting part of its weight on the key so as to sustain the tone. It is this falling back of the arm which is absent in staccato playing. This is achieved by using a poised arm, with no resting weight. As in the case of the key, the fingertip also rebounds instantly. We can do no better than this by forcibly retracting (lifting) it.

A staccato touch can be performed with either the arm ("Wing action"), the hand (wrist) or the fingers. These will be dealt with under separate headings. In the case of the fingers and hand, we have a choice between two options. We can rely on the natural rebound of the key and fingertip, without performing any

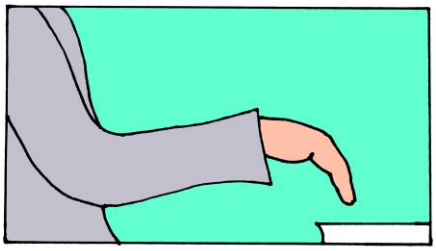
deliberate retraction. In this case, *all* the fingertips (including the inactive fingers), rest on the *surface* of the keys during the silences, supporting the weight of the hand. Alternatively, we can make a deliberate retraction of the finger or hand, which are then held in the air above the keys. This latter option is necessary in certain cases, as explained below.

Staccato with wing action

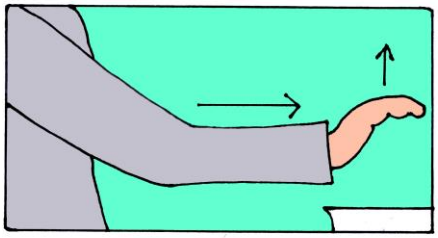
Like sustained notes, staccato notes can be driven from the shoulder using the "wing action" (p.33). As stated above, there is no resting weight, as the tone ends immediately, after which nothing is resting on the key. Staccato represents the simplest form of the wing action, since the initial backward movement is omitted. It consists of just two movements, forwards and back, as shown in the diagrams below. For this reason, it is advisable to become familiar with playing staccato before learning the full wing action with sustained notes. No distinction is made here between staccato for single notes and that used for octaves and chords. The action is exactly the same, except that with single notes there is an additional element of finger movement.

At a slow or medium pace, we "prepare" the note or chord by placing the fingers on the surface of the keys to be played. In this case, we may not begin with the forward thrust as in the normal staccato, as the fingertips would simply dig in to the keys. Therefore we must first "reverse out" as in the first prepared staccato diagram (p.29), in the same way as a car reverses out of its parking place before proceeding forward. The prepared staccato action is very similar to the wing action for sustained notes except that, having played the note, the finger, instead of holding the key lightly, leaves it immediately and moves to the surface of the next key to be played. At a slightly higher speed the preparation feels like playing an interim note on the surface of the keys, half - way between the real notes, so that there is a sensation of "double tempo". At about 180 beats per minute the preparation becomes impossible, and we revert to the normal staccato. However, we still "prepare" the fingers in the air, vertically above the notes to be played. In the case of chords, we form the shape of the chord in the air with our hand. At high speed the hand flutters close to the keys, and the touch feels very relaxed. Rapid octave passages are always practised with a wrist staccato (p.31). However, at a slower tempo, sustained chords and octaves can be played very effectively using the wing action.

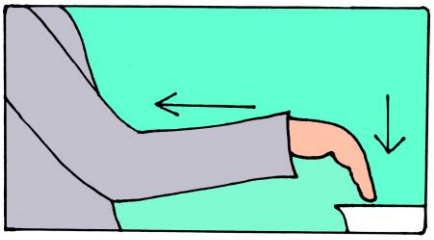
Starting position. The arm is back and the wrist high, with the hand hanging loosely, but in position above the keys to be played.



The arm straightens at the elbow, so that the forearm is pushed forwards, throwing the hand upwards. The hand is not deliberately raised, but is thrown by the arm.

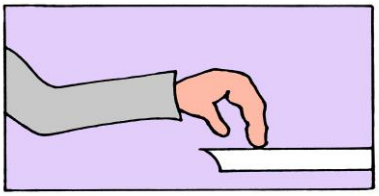


The elbow bends and the forearm is pulled back, causing the hand to descend rapidly, striking the key, after which it is snatched away immediately, resuming its hanging position.

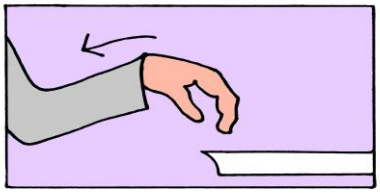


There is no deliberate movement of the hand or fingers. They are thrown. The forearm moves forward and backward rather than up and down. The forward and backward movements follow in immediate succession. The elbows also move slightly outwards as the note is sounded. Even in slow tempo, the action is very sudden. There is a feeling of plucking the notes from the keyboard.

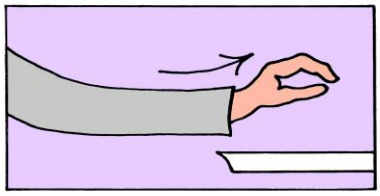
Prepared Staccato Notes and Chords with Wing Action



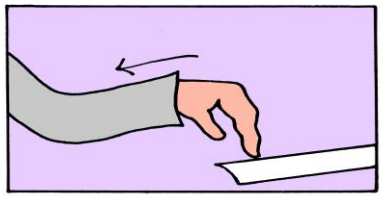
The fingertips prepare the note or chord by touching the surface of the keys to be played. The wrist is held at a moderate height, with the hand as relaxed as the stretch permits.



The elbow pulls back suddenly, lifting the wrist higher, with the hand hanging loosely, but still forming The shape of the chord. The movement sequence is the same as the wing action.



The forearm pushes forwards and the wrist falls, throwing the hand upwards. The hand is not lifted deliberately. It is thrown by the arm.



The elbow pulls back again and the wrist rises, causing the hand to descend rapidly, sounding the chord. The wrist continues to rise, releasing the key, and moving as fast as possible to prepare the next chord, as in the first picture.

Finger staccato

The wing action staccato is the most suitable for slow and medium speeds, but cannot be used at a high speed. Here, finger or wrist staccato is used. In rapid playing, a *leggiero* non legato touch with very little weight and a strong finger action can be used to give a mezzo-staccato effect. Here, the fingers should be much less curved than usual, allowing the tips to rise higher above the keys.

Whilst in sustained playing the hand is supported in a horizontal position by resting its weight on the key bed, in staccato playing, with a poised arm, there are several choices as regards the hand. It can be allowed to hang loosely from the wrist (see p.8), or supported by resting *all* the fingertips (including the inactive fingers) on the *surface* of the keys (as opposed to the key bed). For a very crisp dry staccato, however, we need to lift the hand and keep the wrist low, although this is not a comfortable playing position.

For a quiet, timid, stealthy staccato, similar to pizzicato strings, at a slow or medium tempo, as for example in Bartok's 2nd Romanian Folk Dance, we can use the "rebound" staccato without deliberate retraction, as explained on p.27. All the finger tips, including the unused fingers, are placed on the surface of the keys, "preparing" the notes to be played, but without pressing them down. The downward finger stroke is sudden and decisive, driven from the knuckle but including a slight pulling in of the fingertip. This is quite subtle, and does not in any way amount to a "flicking back" of the finger. There is no conscious retraction (lifting) of the finger, particularly in quiet playing, although in louder or faster passages the fingers will begin to lift of their own accord, and should be allowed to do so. The downward finger stroke kicks the arm upwards (not very high), but without any deliberate arching of the wrist. There may be a slight unintentional upward

wrist movement in response to the finger stroke, but it is minimal and not deliberate. The arm then falls back so that the fingertips are again resting on the keys which are about to be played. This preparation phase begins to disappear as the speed increases. The arm is to a large extent poised but resting a small amount of weight on the key surfaces. This approach produces a cleaner and more precise staccato with less surface noise than the traditional method of sharply retracting the fingers and holding then in a raised position.

However, for a louder staccato, it is necessary to lift the fingers, for the reasons given on page 5. The retraction should take place immediately as the tone is sounded. The arm is poised and the hand hangs loosely. For still greater volume, arm weight can be added by lowering the arms slightly so that the finger engages the weight of the poised arm by pushing up the knuckles and arm momentarily upwards as the tone is sounded. Again, the impetus is felt to come from the finger rather than from the wrist muscles. Immediately after playing the note, and whilst the arm is still rising, the finger retracts sharply, lifting at the knuckle. It may bend slightly as it rises, but again do not flick it backwards, as this wastes time and energy. Here again the arm supports its own weight during the silences between the notes and the hand is left hanging. As the speed increases, the arm is simply "bounced" from note to note by the strong finger strokes. As stated earlier, the hand should not be artificially held up during the silences, as this can lead to stiffness by placing a strain on the upper forearm muscles. This problem can be avoided in two ways.

Firstly, we "prepare" on the key surface as above, and also partially "hang" the hand. During the preparation, the knuckles are only gently curved, so that the fingers have room in which to execute the downward stroke. In this way we can develop the rapid reflexes needed for staccato without risk of stiffening the arm. The prepared finger staccato follows exactly the same arc of movement as the legato finger action, but the fingers rest on the key surface instead of the key bed, and the unused fingers are not lifted high.

Secondly, we can introduce an element of the wing action, yet without any impetus from the shoulder. At the moment of sounding the tone, there is a sharp bending of the wrist (upwards) and the elbow, as though "snatching" the tone from the keys. The hand leaves the keyboard not vertically but somewhat angled towards the player. Afterwards, the elbow is immediately relaxed again as the hand falls back on to the keys. The sudden finger stroke causes the hand to be rocketed into the air, wrist uppermost. The hand then rises, catching up with the wrist, and both fall in a more or less straight alignment, so that the next finger lands softly on the surface of the next key. This method can only be used when employing an extending finger action, as shown in the finger action diagrams (p.7).

The "preparation" can only be done up to a speed of about 180 beats per minute, after which the hand and arm begin to bounce off the keys. This is a similar speed to the cut-off point when using preparation with the wing action. The wrist movement gradually decreases as the speed is raised, and becomes imperceptible at around 4 x 100, being replaced once again by a continuous transfer of arm weight. At this point, the touch can no longer be regarded as staccato, having merged into a non legato. This is a good touch for practising brilliant passagework, as it combines strength, elasticity and a highly articulated sound. It can also be used for practising fingered octave passages and double note exercises. For greater power, we can increase the element of wing action at low speed as follows: Instead of sounding the note directly from the surface position, we can prepare then lift off as in the diagrams on page 29.

Where some notes are sustained whilst others are played staccato in the same hand, the hand is supported by resting weight on the sustained notes (See Ex. 8b-c). Here, no wrist or arm movement is used. Practising rapid retraction in this way does not feel very comfortable, but is of great benefit in developing nimble fingers, which are needed in playing ornaments, repeated notes and fast passages. We can also practise scales and passagework in a staccato touch, using a hanging hand and strong finger work.

The finger staccato can also be applied at full speed using adding notes and groups (see p.52). It is applied only to the *last* note of each group, which is sharply accented and flies off into the air with the wrist strongly raised. It may be necessary to lengthen the silence between groups owing to the high "orbit" of the hand. Finger staccato can also be practised on a springy surface such as the top of the piano stool (see p.42).

31.

Wrist staccato octaves

Whereas the wing action staccato is driven from the upper arms, with the hand and wrist entirely passive, the wrist staccato is the other way round. In some traditional approaches to practising staccato wrist octaves, the arms are kept still and poised, and the hand moves swiftly down from the wrist and immediately up again. It is held in a high position until the next note. In the initial stages of practice, the forearm can be supported and held still by resting it on the upturned palm of the other hand, near the wrist.

This way of playing staccato uses the muscles situated below and above the forearm, which move the hand down and up respectively. The upper muscles, which are working against gravity, tire quite quickly, so that playing octaves in this way can be arduous and painful. I prefer the more relaxed "rebound" method, similar to the one used in a quiet finger staccato (see previous section), which does not involve the upper forearm muscles: Here, the only active movement is a *downward* hand movement from the wrist, driven by the lower muscles. The arms hang loose and passive, with a certain amount of arm weight which is bounced from the keys. The *upward* hand movement is entirely involuntary and is the natural consequence of the hand rebounding from the key whilst the arm drops. This can be practised first with five fingers on the keys E F# G# A# C, then on a three note chord, and finally on two notes a sixth apart, followed by an octave apart. Using five keys facilitates the "bounce" of the hand, due to the increase upthrust of numerous keys.

Place the fingertips on the surface of the keys with the wrist a little high and the hand sloping gently toward the keys. This is the "hanging hand" position (p.8) which puts the least strain on the muscles on the upper side of the forearm. Play the notes staccato with a rapid downward hand movement (upward wrist movement). Leap straight to the surface of the next keys to be played (which may be the same keys or different ones), and wait there, "preparing" the notes. During the ascending part of the leap the wrist is arched upwards, but then falls back of its own accord during the descent, so as to land on the next key in the original alignment once more. The fingertips remain close to the keys during the leap.

Repeat the whole process for every note. This action resembles a frog jumping among the water-lilies. Gradually speed up the passage using a metronome. At about 2 x 80 notes per minute it will become impossible to prepare the notes, and instead the fingers will "bounce" from key to key. A natural "cruising speed" where the hand bounces readily occurs at around 4 x 80 notes per minute. Once full speed has been reached, simply play the passage fast many times, with rest periods in between. During these, the other hand could play the same passage.

Very rapid octaves are impossible if we try to think of both the downward and upward hand movements. ***We should think only of the downward hand stroke and let the rebound take care of the rest.*** The fingers remain close to the keys in rapid playing. If we were to think only of the *upward* hand movement, this would give a more detached staccato but would reduce speed and cause fatigue in the lifting muscles. Given that many rapid octave passages are in any case covered by the pedal, there is often little point in aiming for a particularly crisp staccato.

We play on the fingertips, but the fingers are not particularly tense. In octave playing, the second, third and fourth fingers are completely relaxed and lie flat on the surface of the keys. The 5^{th} finger (or 4^{th} on black keys) and thumb are firmer but not excessively tense. The wrists are slightly high. The arms have a "hanging" feel, loose and relaxed. When using five fingers together as above, the bounce can be felt through the whole body including the trunk and head, and particularly in the back of the neck.

The hand is *not* lifted high off the keys, indeed these barely rise to surface level. As already started, there is no conscious lifting of the hands, the only voluntary movement being the downward one. Octaves played in this way will be rather quiet, for the reasons given on page 5. For greater volume, the hand will have to be lifted, although doing so reduces speed, as the hand has further to travel. The still, poised arm of the first method (paragraph 1) would not allow the hand to bounce from the keys, as there would be no weight available to bounce. The second "rebound" method uses moderate weight and a flexible arm.

Octaves can be practised first on a single pair of keys repeated many times, then as a scale. I like to use the

fourth finger for black keys, although people with small hands may find that the stretch creates tension, in which case they should use the fifth all the time. The fifth has some disadvantages on black keys, however. It is thin and can miss the key. Also, it is necessary to move the hand forward every time a black key is played, whereas the longer fourth finger can reach the key without moving forward.

In order to reduce fatigue, passages or scales using wrist staccato can first be practised in groups of two or three notes separated by rests, then the groups can be increased in length. A little rocking back and forwards from the hips will keep the arms loose, whilst in general sitting or leaning a back slightly with straighter arms will be more comfortable than a close, cramped position.

As the fingers remain very close to the keys, the lateral moves from note to note need to be very tidy. We can approach this problem gradually either through slow practice or by playing three hits on each note (*without rests),* then scaling back to two hits and finally one. In this way we are practising the wrist action rapidly but have more time to think about the lateral moves. Changing notes reduces speed more than repeating a single note, although it is sometimes possible to change between the 5^{th} and 4^{th}, and even the 3^{rd} finger, thereby making the transitions more rapid.

Practising the upper line (4^{th} or 5^{th} fingers) or the lower line (thumb) alone improves accuracy in changing notes. When doing so, try to keep the hand at the same stretch as when playing the complete octave. It is also possible to "shadow" the silent side of the octave by touching the surface of the keys with either the thumb or $4^{th}/5^{th}$ fingers. Where leaps are involved, practising with the eyes closed improves accuracy.

We can play a "double-hit" on each octave, with a downward wrist movement on the first of the pair, and an upward one on the second, which is played staccato and accented.

People with small hands can begin by practising octaves over the interval of a 6^{th}. Those with larger hands may also practise over a 9^{th}, after which the octaves will feel easier. The 5^{th} finger should be used on white keys, and the 4^{th} on black, when playing octaves. This is because the narrow 5^{th} finger can easily slip off a black key. The pianist should prepare the changed hand shape for white or black keys in advance. Sticking to this fingering will aid memorization. However, once again people with very small hands may have to use the 5^{th} finger for both black and white keys.

Wrist octaves can be played quickly, but may be tiring when used for extended passages. The wing action (p.33) is better for long stretches of repeated chords or octaves at a somewhat lower speed. The wing action is also better for heavy, thundering octaves as it brings the larger muscles of the arms and back into play.

Touch changes related to speed

It will be noticed that in many of the above examples, the characteristics of touch change as the speed increases, rather like the gear changes of an accelerating vehicle. A basic principle in practising any music is to start slowly and gradually increase the pace. Therefore, we should select an appropriate type of touch for each speed change. For example, passagework may be practised slowly in a legato touch with resting weight, then at medium speed with a "bounced" non legato touch, and at high speed with continuous transfer of arm weight, also in a non legato. In this case, we should emulate the horse, which passes through four distinct movement species as it accelerates: it walks, trots, canters and gallops. All the different touches should be mastered by practising exercises, so that they can be drawn upon as and when required. Having done this, we should not regard them as stock formulae to be applied in a mechanical way, but should adapt them imaginatively to the needs of the music, rather as artists draw upon the colours in their palette.

As a general principle, the amount of visible movement decreases as the speed increases, just as a ball left to bounce freely will gradually bounce more and more frequently but less and less high. The height of the initial bounce sets a certain speed of travel, and as each bounce gets lower it is able to complete the distance in less and less time. In the same way, we need to increase the distance travelled by the fingers or wrist in slow practice in order to attain the necessary speed of movement for velocity playing. This means using a high and sudden finger stroke in slow practice. The larger the body mass involved in playing a note, the

slower will be the speed at which it can operate. For the playing of very slow, powerful chords, pianists sometimes use their whole body including the torso. At a slightly higher speed, for example when playing strong repeated chords, we may feel ourselves rocked backward and forward on the seat, so that the knees can be seen to move. As the speed increases further the arms but not the torso will be seen to move. At a still higher speed, only the fingers and hands are active, and, at maximum speed, only finger movement is apparent.

Technique and expression

Sometimes students are criticized for a lack of expression in their playing. This may be due, not to some personality defect, but because their technical method is preventing them from achieving variety of touch and dynamics. For example, using the whole weight of the arm the whole time will result in a dull and leaden effect, lacking in variety of touch. On the other hand, pianists who always use an absolute minimum of arm weight will sound silly and effete. Their tone is thin and whiskery, with some notes missed, like a violinist who does not apply enough bow pressure. (In fact, violinists also use arm weight in the bow arm, applied to the string through an opposing action of the thumb and forefinger).

Whilst lifting the fingers high is important when practising passagework, there are those who carry this feature into the performance of smooth, gentle music, giving an impression of aggressivity. People who never lift up their fingers, however, will lack the strength needed to realize the passionate and furious climaxes of Romantic music or the glittering brilliance of Mozartian passagework. Techniques which use maximum arm weight or maximum finger action *at all times* also reduce our ability to emphasize melodic lines (p.25), thereby creating an amorphous, expressionless effect. Many of these problems are due to teachers who seize upon some aspect of technique which is perfectly valid within a limited context, but misapply it across the whole spectrum of piano playing, or who fail in their teaching to distinguish between practice methods and the art of performance. Such a monolithic, unthinking, doctrinaire approach is typified by the phrases "*Always* do this!" or "*Never* do that!"

Wing action for chords and octaves

There are two main types of action in piano playing, namely a **finger action** for passagework, described above, and an **arm action** for chords, octaves and accented notes, which I have named "Wing Action" due to its similarity with the wings of a bird in flight. There are some fundamental differences between the two techniques, as far as the arm is concerned. Most importantly, in slow practice of the finger action, the arm is moved ***passively*** and ***as a unit***, hanging between the knuckles and the shoulder. The movement here is on a very small scale. In the wing action, it moves ***actively,*** in a ***sequential wave motion.***

The wing action is much easier done than said! Please see the diagrams on page 35 before reading the following very complicated explanation. Think of rowing a boat or flying like a bird, then use this arm movement for playing staccato chords with loose, floppy hands and wrists.

Here the arm supports most of its own weight, poised in a state of dynamic equilibrium between the uplift of its muscles and the downward pull of gravity, ready to give either downwards or upwards according to need. The wrists, elbows and shoulders are loose and free. The movement of the arms is a flexible one, with the upper arm descending first, followed by the forearm, the hand, and finally the three joints of the finger, one after another. Likewise, on the upstroke, the upper arm rises first, followed by the forearm and then the hand and fingers, in a continual smooth cycle of motion. This can be practised in the air, away from the piano, then as staccato chords up and down the keyboard. The notes are sounded at the lower end of the cycle, at the point where the wrist begins to rise but the hand is still falling. Due to the delayed action, by the time the downward movement reaches the fingers, and the tone is sounded, the wrist and forearm are already rising.

However, it is more helpful to think of the forearm as moving forwards and backwards, rather than down and up. As shown in the diagrams, the forearm moves forward and slightly downward as the hand rises, and backward as the hand falls. The wrist and elbow bend at the same time, and it is at this time that the note is sounded. In staccato playing there is a simple forward / backward movement. In playing sustained tones there is also an initial anticipatory backward movement (second picture), as the hand is removed from the

key in a hanging position. This initial stage does not always need to be executed deliberately, as it will tend to happen automatically. The pushing forward (third picture) gives rise to a feeling of the arm "digging under" the hand. The pull-back is like a "scooping out".

There is also a slight rotary movement of the arm. During the very brief push forward there is an equally brief turning *outwards* of the arms (right arm clockwise, left arm anticlockwise). This is immediately followed by a turning *inwards* as the arm pulls back and the note is sounded. The two opposite rotations are felt as a single rapid flick. The elbow moves outwards slightly as the tone is sounded. In other words, the upper arm lifts sideways. The action can be practised on one's lap, first standing then seated. The upper arm bobs down just before the note and rises on sounding it. The upward and downward hand movements are not deliberate. It is thrown up and down by the arm movements. This means that, even in slow tempo, the wing action can only be executed as a sudden, rapid movement. In slow motion, there is insufficient "G force" to throw the hand, and it would have to be deliberately lifted by the forearm muscles. These muscles are not used in the wing action, which uses only the muscles of the upper arms, chest and back, in the same way as when sawing wood or rowing a boat.

The idea of using three separate movements in playing a single note may seem overcomplicated and unnatural. Yet it is almost identical to the simple act of throwing a ball. Examples of a forward thrust followed so closely by a backward tug that the two are two are fused into a single act include such civilized pursuits as snatching and punching. Most of the time, the wing action is extremely miniaturised both in space and time, being but a momentary twitch of the arm. It is the visible manifestation of a wave of kinetic energy travelling very rapidly down the arm towards the keys, creating a momentary impact, after which the weight is immediately lifted out. A similar type of chain reaction can be found in the movement of a whip.

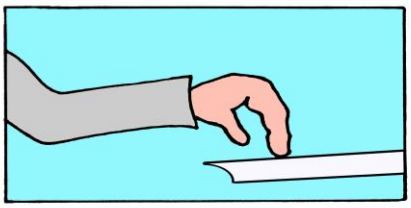
An arm action is not suitable for practising passagework, as it is impossible to use it a high speeds. The finger action (p.4 onwards) is used for this purpose. However, when rapid notes are divided into phrases, the wing action comes into play, following the shape of the phrase rather than the individual notes. Phrases begin at the point in the cycle where the wrist is falling and end when the wrist rises (see p. 35).

What is happening and what we see are different, just as when an aircraft, upon landing, applies reverse thrust to its engines. Although these are working backwards, the aircraft is still moving forwards, finally coming to a halt. In the same way, the dog owner tugs desperately at the lead whilst the dog continues relentlessly moving forward. This needs to be borne in mind by the teacher, who will see only two movements of the upper arms; backwards then forwards. Furthermore, the pupil will also see only these two actions when the teacher is demonstrating.

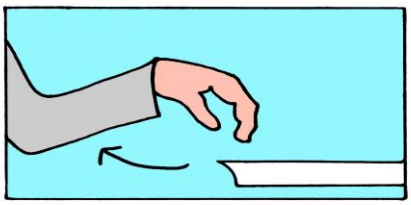
The wing action should first be practised with staccato notes, octaves and chords (see p.27). These omit the preparatory pull-back (diagram 2 below). Initially it could be practised with only the middle finger, or with thirds played by the second and fourth fingers (see Exercise 8). In this way the arm action can be perfected without adding the further complication of changing fingers. When used for cantabile melodies, and also in controlled, quiet playing, the wave motion is channelled down one or more fingers by partially withholding the others. It can be performed with relatively passive, relaxed fingers, moving only sufficiently to guide them towards the required notes. Here, the hand-lift is very small, sometimes barely reaching the surface level of the keys. The large muscles of the upper arms and torso allow much greater control of dynamics than do the small finger muscles.

Whilst arm movements cannot be carried into very fast playing, they can still be used in fast pieces. They move with the slower notes, but not the quick ones. This also applies when one hand is playing slower notes and the other executes rapid passagework. A good introduction to this idea is to practise the 2-part inventions or other 2-part pieces of J.S. Bach, playing the semiquavers (1/16 notes) non legato with a finger action and the quavers (1/8 notes) staccato with the wing action. In the case of a melody with a quiet, flowing accompaniment, the arm will move with each melody note. In strongly rhythmical music with a driving beat, a Baroque Gigue for example, the strong beats may be emphasised with an arm movement.

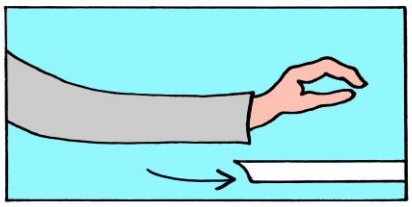
Wing Action diagrams



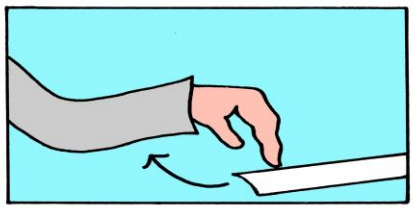
The finger sustains the previous note lightly. The wrist is held moderately high.



The elbow pulls suddenly back and the wrist is lifted higher, with the hand hanging loosely.



The forearm pushes forwards and the wrist falls, throwing the hand upwards. The hand is not deliberately lifted. It is thrown by the arm.



The elbow pulls back again and the wrist rises, causing the hand to descend rapidly, striking the key. The wrist continues to rise slightly more, releasing the weight from the key, which is held lightly as in position 1.

The whole sequence takes place within a split second, even in slow tempo. It is usually greatly miniaturised, consisting of a barely visible twitch of the arm. Stage 2 applies only in slow playing. From the observer's point of view, the elbow moves noticeably backward in stage 2 and forward in stage 3. In stage 4 (the sounding of the tone), the elbow remains in roughly the same place, but bends so as to lift the forearm. From the player's perspective, however, there is a strong sense of pulling back in stage 4.This serves as a braking action to the forward thrust in stage 3. This sounds bewildering, but it is quite simple when you try it!

The natural touch resulting from the wing action is non legato (p.12). This will seem strange to followers of "arm weight and relaxation", for whom the natural touch is legato. A modified wing action can be used to achieve legato. Here, the fingers remain in contact with the keys, but the wrist bobs down just before playing each note, then up again as the note is sounded. In this case, there is no lifting of the hand from the keys, as this would inevitably cause a brief silence.

Wrist movement in phrasing

Phrasing brings life and shape to a melody, and can be enhanced by the simple technique of dropping the wrist at the beginning of a phrase, and raising it at the end. This motion can first be practised with single triads then single notes, then with phrases of 2, 3 and more notes. We can annotate the score with down bow and up bow signs to indicate the position of the wrist as down or up. At the beginning of the phrase, the forearm moves down, leaving the hand behind in the air. This causes the wrist to drop, shown by a down bow sign. The back rounds slightly (see p.38). At the end of the phrase the forearm rises, again leaving the hand behind, in a hanging position. The back straightens. At this point the wrist is high, as indicated by an up bow sign.

We "drop" arm weight on to the first note of a phrase. The falling arm is caught and held by the hook-like fingertip. This begins the process described on page 5, whereby the ensuing fingers "react" against the

resting weight by lifting it so as to deliver kinetic energy to the keys. ***Therefore, the first note of a phrase is sounded by an entirely different means from the remaining notes, i.e. by "dropping" as opposed to "lifting".***

The phrase may be unaccented, or the accent may be placed on the first note (down wrist) or the last note (up wrist). As many phrases begin on weak beats, accenting the first note lends an expressive syncopation to the music. It is particularly effective in the strongly contoured music of the Classical period, especially in Mozart. Accenting the last note (up wrist) gives a much stronger effect, particularly if it is played staccato. Placing accents depends of course on the musical context. Within a phrase, the gradual falling and then rising of the wrist gives a crescendo and diminuendo which is a typical musical feature of many phrases. This is because weight is gradually introduced then withdrawn. The hand and forearm always move in opposite directions, and this constant wave motion brings freedom of movement and avoids stiffness.

In playing a single note or chord, the note is sounded at the beginning of the up-stroke (see p.36). This coincides with the "tip" of the "wing action" described on page 33. The note may be unaccented or accented. We should never use an individual downward stroke of the arm for single notes within a passage or phrase, except for the first note. This is a common failing among children, who sometimes play notes with a rigid arm action. In rapid passages, individual notes are produced by the fingers, whilst the arm movement is completely independent, and follows the shape of the phrase (down at the beginning, up at the end).

For long phrases where arm weight is used, the wrist may also move during the phrase, following the natural movement of the hand as it navigates around the keyboard. In general, it will tend to rise when playing groups of black keys and sink for the white keys. The wrist movements should be determined intuitively by experiment, and again these can be noted in the score by means of down bow and up bow signs. The arm weight must remain constant, otherwise the tone will reduce as the wrist is raised. Lateral wrist movements are used to place the hand in the optimum position for playing different groups of keys, and can be annotated with left or right arrows.

When a rest follows the end of a phrase, the hand is lifted off altogether, leaving the hand hanging in the air.

When the last note of the phrase is sustained, we hang arm weight down from the key, clinging with the fingertip. If the sustained note is particularly long, we lift out the weight and let the hand hang in the opposite way, from the wrist, holding the key down very lightly, again with the fingertip.

The wrist action in phrasing is not usually evident in very slow playing. In passages of medium speed, we may encounter a compound arm movement, in which the very small *up-down* arm movement associated with individual notes, as explained on page 5, occurs within a larger overall *down-up* wrist movement for the phrase. At high speed, the wrist action in phrasing can also be combined with a sense of even transfer of arm weight, or, once again, can be done without arm weight depending on the volume required.

The down-up pattern can also be applied to phrases consisting of octaves or chords. Here again, there is an up-down wrist movement for each octave, within the overall down-up movement for the phrase. This technique is especially useful when playing small, rapid groups of two or three chords or octaves. Here, the last octave of the group is played with a strongly accented staccato, using a sharp upward wrist movement (see next chapter).

Some special techniques with chords and octaves

Preparing hand shape in chords and melodies

Every chord has its own unique hand shape, due to the fact that those fingers playing on black keys are less curved than those playing on white keys. The shape for each chord can easily be determined by experiment, the main criterion being what feels most comfortable. We should always prepare the hand shape of a chord in advance of playing it, either on the surface of the keys or in the air above the keys.

It is helpful to practise alternating between different chords, changing the hand shape each time. Even when

playing entirely on white keys, there is no fixed hand position. For example, when playing adjacent white keys as in scales, the knuckle joint is strongly bent, whilst the fingers are only gently curved. When the white keys are spaced apart, as in arpeggios, the knuckle will be flat or even bent downwards slightly, giving an appearance of a high wrist, whilst the second joint of the fingers will be strongly curved. When practising arpeggios, the hand shape for the corresponding chord should be retained throughout the arpeggio, even when it involves a mixture of straight and bent fingers.

Chords and octaves are normally played using the wing action or a finger or wrist action, as seen in the section on staccato (p.27). Sustained chords are generally played using the wing action. When playing a single, imposing, sustained, isolated chord, octave or note, we may use the same technique, but instead of holding the tone in high position, we allow the wrist to drop to a comfortable low position for the remainder of the chord. In other words, there are two up-down movements, the first large and slow (the anticipation), the second small and rapid (the sounding of the chord). There may also be a third, even smaller "aftershock". The chord is sounded at the beginning of the second up - stroke. The whole body and head will move in response. Examples would be the first chord or Beethoven's Pathétique Sonata, or the first note of Chopin's first Ballade. Before beginning these pieces, the fingers should rest for a while on the surface of the keys. This may all sound very fussy when we are talking about just one note, but the alternative may well be a clumsy, wooden, awkward, embarrassing moment at a critical point in the music.

Powerful chords, even though they may not be staccato, can be played using a prepared wrist staccato and held with the pedal. In other words, we prepare the chord on the key surface, play it staccato by means of a sudden upward wrist movement, and move immediately to the surface of the keys in the next chord. An example would be the climax of Rachmaninov's Prelude in C# Minor. The staccato is easier than trying to hold down the chord, and gives more time to prepare the next chord.

Staccato octaves are played either using the wing action (p.33) or a wrist staccato (p.31). For all details on octave scales and passages please see page 31. *Melodic legato* octaves can be played with a finger action on the upper notes, using fingers 3, 4 and 5, whilst quietly gliding the thumb across the lower keys. Emphasizing the upper notes gives an expressive singing tone to legato octaves. As volume depends on a combination of weight and speed (p.5) we need to rest most of the weight on the upper fingers, and also to lift them high and bring them down rapidly (See Ex. 7b).

Gliding chords

For repeated chords used in accompaniment, as in Chopin's 4th Prelude, we use a slow, smooth version of the wing action (p.33) beginning with the back and shoulders, but without lifting the hand at all. The fingertips remain in contact with the keys. The fingers extend (straighten) slightly and the wrist rises, pressing the key down. The fingers curve as they release the key, with a "stroking" motion. The whole pattern should follow in a continuous cycle, giving a feeling of smoothly gliding from chord to chord. Where octaves or chords form part of a smooth melodic line, they should be fingered like any other two (or more) part texture rather than treated separately. Here, octaves can be played with the third finger as well as the fourth and fifth. Accenting the top note of each chord produces a very expressive effect. This can be done by using a stronger finger stroke and more "resting weight" (p.15) for the top notes. A useful exercise is to repeat a note or chord fairly slowly and quietly, leaving an absolute minimum of silence between the repetitions. The keys will remain partially depressed all the time, never fully rising to the surface.

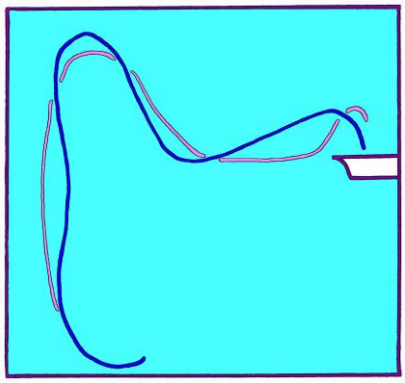
Rapid pairs of chords

Where a chord is played twice rapidly, or two different chords follow each other in rapid succession, the first should be executed with a down wrist movement, the second with an up wrist movement. It is possible to accent the first (down) chord, but the effect is much more "snappy" when the second (up) chord is accented, using a wrist staccato, with the first chord being a quiet anticipation. The right hand of Chopin's "Revolutionary" Etude can be played in this way. When three chords or octaves are played rapidly as a group (a favourite practice of Rachmaninov), the first should be played with a down wrist, the second is at the bottom of the arc, and the third is played with an accented staccato up wrist. The hand will also move slightly backwards during the playing of the two or three chords.

Weighing the notes of a chord

So that all the notes of a chord sound out equally strongly, we should practise each note individually, as well as in simultaneous pairs or groups of three or four notes. If one note of the chord needs to be louder than the rest, this can be incorporated into the "weighing" process. We can also play the whole chord several times, accenting each note from the bottom to the top by applying a stronger finger stroke and more resting weight to that note.

Action of the back



For loud, emphatic playing, particularly with chords, we can reinforce the arm action with back movements. Some concert pianists can be seen briefly rising from their seats when playing such chords. In doing so they are transmitting a wave-like impulse of kinetic energy to the keys, enlisting not only the weight of the arms but that of the whole body. Given that the "default position" of the wrist in the wing action is "high" as opposed to "dropped," the default position of the spine is the straight, tall one shown by the blue line in the diagram above. When the wrist bobs down momentarily to the low position, as shown by the pink line, just before playing a note, the back is allowed to relax into a slightly rounded, "slouched" shape. It immediately bounces back up as the note is played, and remains in the "high" position until just before the next note. Long hours of practising can be very tiring for the back, particularly as it is partially supporting the weight of the outstretched arms. It is a good idea to lie down for a few minutes every now and then. These breaks can be combined very well with "mental practice" (see p. 50).

The mechanics of tone production

This section examines in greater depth the reasoning behind some of the practical approaches set out in previous chapters.

As in any athletic activity, strength is combined with flexibility, and every muscle and joint must be able to absorb impact and rebound in an elastic manner, with no part of the body held rigidly. The semi-poised arm is like a horizontal leaf spring pulled one way by gravity and the other by its muscles. When deflected upwards, it pushes back towards its normal position. Newton's third law, (For every action, there is an equal and opposite reaction), dictates that when the fingertip strikes downwards against the resistance of the keys, the knuckle kicks upwards with equal force, pushing the spring upwards. The momentary impact of the finger end on the key bed is felt simultaneously as an upward impact in the knuckles. Gravity then acts against the finger muscles, trying to pull the arm down again, and it is in this way that a sudden impulse of arm weight acts upon the keys. As soon as the arm has dropped to its normal position (which happens immediately once the tone has sounded), equilibrium is restored in the spring, and gravity no longer pushes down on the finger, apart from the resting weight, which is much less than the force of the finger stroke. In this way, gravity functions as an elastic resistance against which the finger braces itself. Again thanks to Newton, this means that our touch on the keyboard will be elastic and "bouncy", like a runner wearing gel trainers instead of wooden clogs. This is why pogo sticks are fitted with a spring.

When trying to explain this to students who are weak in physics, we could use the following analogy: When the jet stream from an aircraft pushes the air backwards, the air's resistance pushes the aircraft forwards. In the same way, the bottom of a car tyre pushes backwards against the road, causing the car to move forwards.

Likewise, when the knuckle end of the finger kicks upwards against the arm's weight, the arm's resistance kicks the fingertip back down against the keys.

In the unthinkable circumstance of having to push my car down the drive, my own weight will be insufficient to achieve this aim. If, however, I brace myself with my back to the garage door, the much greater mass of the garage will enable me to move the car effortlessly. In the same way, the mass of the arm braces the hand and fingers against the upthrust of the keys. In other words, when an irresistible force meets an immovable object, then the entity generating the irresistible force will be obliged to move backwards, unless it can find another immovable object facing the other way.

If a diver tries to drive a post into the sea bed, this will fail as the diver will be constantly pushed upwards. If, however, the diver braces him/herself against the greater mass of a whale which happens to be floating (poised) just above, the post will be easily pushed in. The whale itself is not resting its weight on the sea bed. The diver encounters its weight by lifting it above the level at which it is poised. This situation is analogous to leggiero or staccato playing, when the arm is fully poised.

A weight is only useful when converted into movement by being either lifted or dropped. The piano mechanism does not "understand" weight. It only understands "speed of key descent", which it converts into "volume of sound". This can be established by lowering a very heavy object very slowly on to the keyboard from a crane. The resultant sound will be faint. A boy sitting on a see-saw may counterbalance his friend at the other end by gently leaning backwards. However, if he climbs on to a tree branch and drops on to the see-saw from a height, his friend will be sent flying into the air. This is why using a lot of arm weight combined with a weak finger stroke will not achieve a strong tone, and nor will weight which is gently "transferred" from finger to finger. A chain is as good as its weakest link, and no amount of arm weight will produce a strong tone via a weak, flabby, slow-moving finger. It is all a matter of transmission of energy.

I would distinguish here between *momentum*, which is the "unstoppability" of an object, and *kinetic energy*, which is the amount of "zap" or "impact" which it has on things that are hit by it. The heavy, slow-moving object above has a lot of momentum, as it would be difficult to stop, but not much kinetic energy, due to its lack of speed. Thus, while our finger strokes are endowed with both momentum and kinetic energy, the latter correlates better with the volume of tone produced (see p.5).

The immense power of mains electricity will not bring warmth to the home if it must first run through a one amp fuse. Similarly, the boxer may put his full body weight behind the punch, but if he has very weak arms, he will injure himself rather than the opponent. A mighty giant wielding an axe made of jelly will be unable to crush even the smallest flea. On the other hand, a very lightweight object fired rapidly at the key would also have little effect. The force of a moving object (*kinetic energy*) is a combination of weight (mass) and speed, as anyone who has been hit by a meteorite will tell you, even without the help of Newton and Einstein. Piano teaching has tended to be polarized between proponents of a strong, rapid finger action and believers in arm weight, whereas in fact we need both.

The fingers need to be trained not only as moving units but also as transmitters of impulses of arm weight, which implies practising at high volume and with resting weight. Practising without arm weight will never build strong fingers. Operating in a weightless environment causes the body to lose strength, as can be seen in the case of returning astronauts, who are often too weak to walk. The bones and muscles build strength in response to the load put upon them. Having said this, however, we often *perform* with a much lighter touch than the one used in practising.

The "dropping" mentioned above is a little difficult to see in the case of the arm, as it does not drop vertically. Because the keyboard is in front of the player, and the arm is, on average, sloping towards it diagonally (with a bend in the middle), the weight pushes *down and backwards*, eventually converting to a downward hand stroke as the forearm *rises* on sounding the tone. The net direction of the weight is downwards, just as the direction of mains water is downwards from the reservoir, even though it may be travelling upwards in the pipe system of your house. It is very important to steer pupils away from the habit

of producing notes by directly dropping the arm as a unit on every note. This is only done for the first note of a phrase, in order to instate resting weight on the first key. The remaining notes are produced, as already stated, by means of the fingers pushing the arm *upwards.*

In summary, we have an expanding unit (the finger) kicking simultaneously upwards and downwards. In legato, it kicks upwards against the stationary mass of the arm. In non legato, the mass is not stationary but is itself endowed with a downward momentum, thus impacting the key with redoubled force. In its "raw" state this produces a hard, crude tone which we must then refine to serve our artistic purposes. We do this by applying it in varying degrees of strength to each note so as to create, in musical terms, a balanced vertical texture and a meaningful horizontal progression.

Matthay (p.59) argued that we should never use arm weight for holding down a tone after it has been sounded, (a) because only a minimal weight is needed to hold the key down, and (b) because it puts an unnecessary load upon the finger muscles and on those muscles which keep the wrist up. This can be seen by resting the whole weight of the arm on the keys whilst holding down, say, a triad. If we were to relax the finger and wrist muscles, the hand would be dragged from the keyboard by gravity. Therefore these muscles are working very hard just to keep the hand on the keyboard and hold a key down, with no musical goal, as the note has already been sounded. I agree that we should not rest large amounts of weight on a finger for long periods of time, for example, when playing at slow tempo, or with long notes (e.g. minims and semibreves) at a quicker tempo. However, a moderate amount of resting weight is necessary for passagework, even at a slow pace, (a) because the weight would otherwise have to be supplied by means of an arm movement, which would render the music "choppy", (b) because the tone is produced by the finger stroke reacting against the arm's weight, therefore the weight must be there in the first place, (c) because it translates directly into what will happen as we speed up the music (d) because a heavier arm rebounds better from the key bed. Therefore arm weight resting on the key is like a security guard on duty, who is being paid to do nothing most of the time. It is using energy and performing no useful function, but is "on hand" ready to react against the next finger stroke. Like the raised fingers, it is a "preparatory" stage.

Matthay's idea of taking out all the weight has proved to be a red herring which has prevented people from relaxing their arms when playing. Even so, the resting weight should not be excessive, as it would then become a burden on the fingers. Some teachers of "arm weight and relaxation" overlook this. One of the main reasons why some people sometimes use too much resting weight when holding a tone, is the desire to create a feeling of continuity in melodic lines. When singers, wind or string players wish to produce an unbroken stream of sound, they do so by means of continuous expenditure of energy in tone production. However, in the case of pianist, the "continuity" is an illusion created by a series of brief impulses of energy at the beginning of each note, then sustained with significantly less energy. Its appearance belies the means of production, just as the smooth gliding of the swan belies the frantic paddling going on beneath the surface.

In slow practice of passagework, we experience each note as a separate impulse of energy. As we accelerate to the point where the touch turns into a "bounced" non legato, we can feel the arm resting on an "air cushion", held up by the rapidly repeated thrusts of the fingers. Gat (p.59) poetically compared this with the action of a road drill, no doubt fitting imagery to a Hungarian writer of the Soviet era. Each jab of the drill propels it upwards, and before it has time to fall to the ground the next jab sends it up once again.

If we play an accented staccato note, driving the arm into the air, then let the finger fall back on to the key without attempting to hold the arm up, the second note will be sounded at a speed of about 184 beats per minute. This is therefore the lowest possible speed for bouncing unsupported arm weight. Between the speeds of 184 and 368 (4 x 92), we have a choice between sustaining notes, or using bounced arm weight.

In quiet playing with a hanging hand, we are not consciously using weight, but the "horizontal leaf spring" (p.38) of the poised arm is still present, passively reinforcing the finger stokes against the upthrust of the keys, and providing a stable platform to which the fingers are anchored at the knuckle joint. If the fingers were not attached to the arm in this way, they would be too light to make any impression upon the keys,

however agile they may be. They would be like a featherweight boxer who takes on a heavyweight, and finds that his own punches simply drive him backwards, without even being noticed by the opponent.

Controlling Articulation

At a slow tempo, it is possible to control articulation by exactly timing the retraction of each finger. However, at a medium or fast pace, it is determined by the strength of the finger strokes and the amount of arm weight. Given that the kinetic energy which drives the keys is obtained by multiplying arm weight with the square of the finger speed then dividing by two (see p.5) it follows that we can obtain the same volume of tone using a light arm and fast finger stroke or a heavy arm and slow finger stroke. The difference will be in the articulation. For a given finger stroke, a lighter arm will be propelled higher, and will fall back more slowly, increasing the length of the silence between the notes. A faster finger stoke will propel the arm still higher. In other words, the stronger the finger action and the lighter the arm, the more detached the notes will be. It should be added, however, that higher levels of dynamics require a good deal of both arm weight and finger action. The other aspect affected by varying the proportion of arm weight and finger action is the noise element in the tone. Finger lift favours higher-pitched upper noise whereas arm weight favours lower noise (see p. 26).

Therapeutic exercises

The following anatomical point is laughably obvious, yet it is often overlooked in piano teaching. As mentioned elsewhere in the guide, the rationale behind any programme of physical training is that the body gradually adapts to demands which are consistently placed upon it over a significant period of time. Muscles are designed to deliver kinetic energy (*i.e.* the power to move things), therefore in order to make them as strong as possible, we must ask them to deliver a large amount of energy on a regular basis, although not to the extent of causing injury.

When a muscle is exerted, it contracts, pulling the joint in question in one direction. The antagonistic muscle situated on the other side pulls the joint the opposite way. When subjected to strenuous exertion over a long period, either of these muscles will tend to foreshorten, becoming less able to stretch, so that the muscle pulling the other way will encounter a resistance, and the joint will become less flexible. Therefore in addition to the muscle-building process resulting from normal practising, we also need to perform stretching exercises, some of which are given in point (h) below and on pages 43-44.

A strong finger action combined with a large amount of resting weight (p.15) makes excellent “high impact” work, developing strength and endurance in the fingers. However, when taken to excess it can cause pain or even injury, particularly in the 4^{th} and 5^{th} fingers. The following remedies may be helpful.

Practise with a leggiero touch, i.e. a non - legato with a strong finger action but with the arms as light as possible, pulling away from the keys, and with the hands hanging loosely.

Working against a continuous, even resistance is a wonderful way of creating suppleness, as swimming and aqua aerobics prove. See the section on dynamic exercises at the end of this chapter.

With the hands in hot water, gently alternate between making a fist and stretching the fingers out.

With the arms hanging loosely by the sides, shake the hands rapidly by rotating the forearms from side to side. This can be combined with swinging the arms backwards and forwards.

Some “relaxation methods” claim that practising exercises, especially with raised fingers, causes injury. This is like the attitude of over-protective parents who do not allow their children to participate in sport. They will end up weaker and more vulnerable in the long term. The old idea of “No pain, no gain” has some validity. Nevertheless, we should minimise the risk by bearing certain points in mind:

a) Do not adopt a fixed, strongly curved finger shape.
b) Do not hold the unused fingers rigidly at maximum height.

42.

c) Use arm weight and strong finger work but do not take either to excess for prolonged periods.

d) The hands should be supported by the fingers which rest on the keys, not by the forearm muscles.

e) The wrist should not be held excessively high or low or twisted too far to the sides.

f) When speeding up a passage, do not use arm movements when playing at high speed. About 4 x 92 be a maximum. Above this speed, we must make a deliberate gear-change to a pure finger action with varying amounts of continuous arm weight.

g) Avoid working too long and hard at high impact endurance studies, especially exercises for the fourth and fifth fingers, played loud and fast. These provide great benefits in terms of technique, but can easily lead to injury. It is better to do them in relatively short bursts, interspersed with low impact work, for example memorization. This is a similar concept to "interval training" for runners, where short sprints are alternated with period of running at a steady pace. Alternating mental and physical work gives both the mind and body a chance to recover. Another good strategy is, when speeding up a page from a new piece with the metronome, add on one playing through a section from exercise 7 as a "supplement", at the same metronome speed as the page just played. Do this for each speed level.

h) A common objection to the raised finger method is that it puts a strain on the upper muscles and tendons which raise the fingers. This is partly because they are working against a lack of flexibility in the antagonistic lower muscles, which are trying to pull the fingers back down. The exercises in the left hand diagrams below stretch the lower muscles without putting a strain on the upper ones. Moisten the hands slightly. Use a plastic or leather covered duet stool with a firm cushion in the centre, as in the upper picture. Place the hands in the corners with fingers and thumbs outstretched. Gradually lean forwards so a stretch is felt along the muscles on the ***underside*** of the forearm. Hold for several minutes. Leaning away diagonally from each hand in turn increases the stretch. The arms can either be passive and relaxed or we can push them back, straightening at the elbows, but still keeping the hands and wrists completely relaxed. Come out of the stretch very gradually. Do not attempt to bend the fingers for at least a minute afterwards.

If a duet stool is unavailable, the exercise can be done in a standing position using a normal stool. Alternatively, in a kneeling position, bed the fingertips into a rug in a claw-like manner, as in the lower picture, and gradually lean forward. A foam exercise mat is even better, although this will eventually destroy the mat. The last of these poses can also be practised with an additional strip of foam beneath the fourth fingertip. This finger has difficulty in lifting, and often delivers a weak tone, as it does not have sufficient distance over which to accelerate.

To stretch the ***upper*** muscles of the hand and forearm, bend the fingers to make a very gentle fist, then encircle this with the other hand, so that the thumb is pressing the second and third fingertips into the palm (see illustrations above right). Pull the hand inwards until a stretch is felt, and hold for several seconds. Repeat with the third and fourth fingers. The "inner" hand should be completely relaxed. In all of the stretching exercises, go into and out of the pose very slowly and carefully, and do not go immediately

into the opposite pose.

Gymnastic exercises
Again using the piano stool, remove the cushion. Kneeling beside the stool, practise the following staccato touches, using the soft surface to cushion the fingertips. The stool functions as a trampoline. After doing the exercises, return to the stretching exercise.

Wing action: Using the piano stool, apply the wing action (see p.33) to the whole hand first of all, then each finger in turn, many times. Here, the hand and fingers are passive, the impulse coming from the shoulders and upper arms. Work at a natural cruising speed (probably around 200 strokes per minute).

Bounced arm weight: This is the opposite of the previous exercise, with the shoulders and upper arms completely relaxed, and the work being done by the finger muscles. This will produce a stronger attack than the wing action. This can be alternated with the wing action in order to give rest periods to each set of muscles. Also practise with one hand using wing action, the other using bounced arm weight. We can also practise wrist staccato, moving the whole hand downwards from the wrist (p.31).

Combined wing action and bounced arm weight: This produces a much stronger attack than either action alone. Again, try this first with the whole hand, then with each finger in turn.

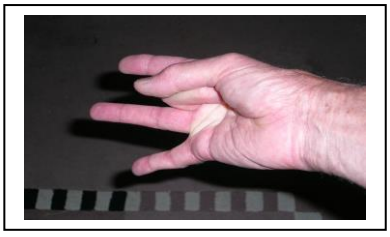
Vertical and lateral stretches *between* the fingers have long been regarded as an essential element in clear and precise playing. With a few exceptions, I am not the inventor of the poses shown below, but have been unable to establish the original sources as they appear in numerous different locations. They require no special equipment. Some are powered by the intrinsic muscles of the joints in question, whilst others use an external element, for example the other hand, or a piece of furniture. Each pose is held for several seconds, increasing the time as the hand becomes more supple. They should be done very gently and carefully.

Finger-stretching exercises

Hold your arm out straight with the palm upwards. With the thumb and fingers of the other hand, pull each finger and also the whole hand down and back. Gently press the thumb into the knuckle joint. This stretches the flexor muscles.

Hold your arm out straight with the palm as shown. With the thumb and forefinger of the other hand, press each curled finger in turn into the palm, pulling the hand towards you. This stretches the extensor muscles.

Press each curled finger into the palm using the thumb of the *same* hand. For the 5th finger, use the thumb and forefinger of the *other* hand. Stretch the remaining fingers out straight.

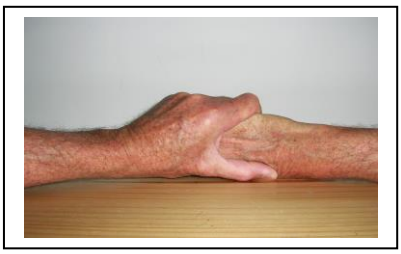


44.
Spread three fingers flat at the edge of a table, with the wrist bent back. Curl the remaining finger as though *trying* to touch the palm. (It will not be possible to *really* touch it). Repeat with each finger except the thumb. Then try "helping" the curled finger with the other hand. It will now be able to touch the palm.

Hook each finger in turn around the side of a bookcase. Pull the other fingers away from it using the fingers of the other hand. This develops the lateral stretch between the fingers. It can be done with the fingers curled or straight. The thumb can also be stretched out in this way.

Hold your arm out straight. Press the thumb into the palm at the base of the 5th finger, and make a fist around it with the other fingers. Turn the hand outwards (ulnar flexion). This is very valuable in preparing for passing the thumb under, for example when playing arpeggios.

Lay one hand and arm sideways on the top of a cupboard, with the thumb and index finger down. Rotate the hand towards you using the other hand. This serves the dual purpose of pressing the thumb inwards and aiding the inward rotation (pronation) of the forearm. We use this rotation unconsciously all the time when playing so as to bring the hands in to a horizontal alignment.



Arm-twisting exercise: Both pictures show the left arm. Hold the arm outstretched and turn the hand *anticlockwise* so that the palm is facing upwards, as in the first picture. Place the hand in a confined space within a bookcase. With the trunk remaining vertical, turn the whole body slowly to the right, away from the bookcase. A strong twist will be felt in the elbow, forearm and wrist. Do not twist excessively. Hold for some time then slowly return to normal. Now remove the hand from the bookcase and turn it *clockwise*, so that the palm is again facing upwards, Place the hand in the confined space, as in the second picture. Turn the body to the left, towards the bookcase. The opposite twist will now be felt. Repeat the whole process with the right arm, reversing the directions of twist.

Go into and out of all stretches slowly and carefully, and do not stretch to painful levels.

45.

Dynamic exercises using physiotherapy balls and similar objects: In order to build strength we need to work against a resistance, yet the piano action does not provide very much of this. If weight lifters simply moved their arms up and down without carrying any weights, they would not develop great strength. Nature designed our fingers as squeezing or gripping tools, not as hammers. They can be strengthened by squeezing a physiotherapy ball, or better still an egg-shaped or cylindrical object. The latter can be made at home by rolling a strip of foam rubber, by using foam insulation for pipes, a "pool noodle" or a partially inflated balloon or wide bicycle inner tube. The last of these can be adjusted as to pressure and diameter to suit one's hand. They are not used in the normal manner, by squeezing all the fingers at once in opposition to the thumb, as this would undermine the independence of both fingers and thumb. Rather, the thumb is left out to the side, and the ball is squeezed against the palm by each individual finger in turn, whilst the other fingers pull back, either in rounded or straight form. Also use 2 and 4 together, and more importantly, 3 and 5 together. Stand with the arms hanging loosely by the sides, keeping the wrists in a straight alignment. In triple time, squeeze and hold for the first 2 beats, and release on the third. Repeat 4 times with each finger. Repeat the whole sequence until tired. Then perform rapidly repeated squeezes, keeping the other fingers retracted. The thumb can also be used to squeeze the ball against the opposite side of the palm, but without involving the other fingers. These exercises also strengthen the small muscles of the fingers, which are important in velocity playing (p.9). When no equipment is to hand, we can press each fingertip into the palm of the same hand, again using a squeezing action, and retracting the other fingers. After doing these exercises, relax the muscles using the stretching exercises shown above.

Practising on a weighted keyboard is a good way of strengthening the fingers. The increased upthrust of the keys demands more arm weight, so that the muscles have to work against both of these opposing forces.

Conversely, people who normally practise on a lightweight keyboard will find themselves at a disadvantage if they are required to perform on a typical modern grand piano with a heavy action. People who practise on an *electric* piano will have a further disadvantage in that they can produce a strong tone simply by turning the volume up, and will therefore probably have become used to playing with weak finger strokes and minimal arm weight.

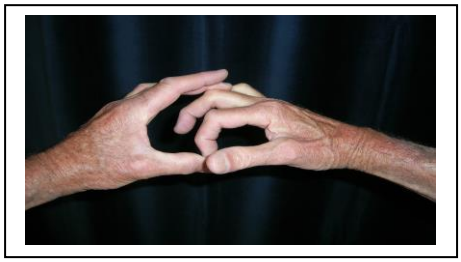
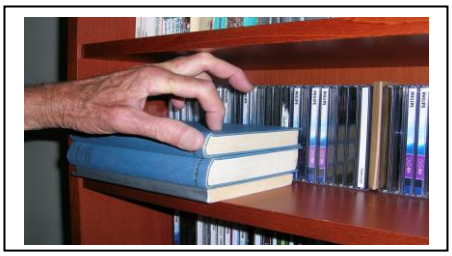
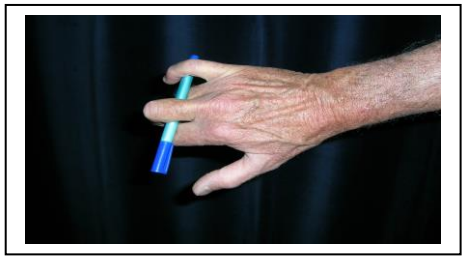
To strengthen the *lifting* muscles (extensors), cut a small balloon as shown, and wrap the middle part around each pair of adjacent fingers except the thumb, encircling them from the fingertip to the first phalanx. Alternate the two fingers (up and down) in mid-air, with a high, sudden action in fairly slow tempo, until tired. Rest then repeat several times, increasing the speed. This can also be performed as an *isometric* exercise, *i.e.* holding each position without moving for, say ten seconds (see below).

Take a piece of 2-inch thick foam rubber and make four holes, about an inch apart, in a gentle arc, using a sharp object. Wedge the foam between the shelves of a bookcase, as shown. Alternate fingers 2 and 3 up and down at a medium pace with strong, sudden strokes just as when practising. Repeat with each pair of adjacent fingers except the thumb. The foam provides a resistance against both the flexors and extensors. Again, different positions can also be held as an isometric exercise.

Isometric exercises

The value of isometric exercises in piano playing is not yet very clearly established. Here, as stated above, the muscles are working at full power yet without any movement occurring, either because the opposing force is equal to theirs, or because they are pushing against a rigid resistance. It is sometimes assumed that,

because no movement is taking place, nothing is happening, yet I would argue that precisely for the same reason, isometric exercises offer an ideal opportunity for the muscles to deliver maximum force for prolonged periods. As soon as the opposing force gives way, as for example in a tug of war, the muscles are no longer able to expend the same amount of effort. It is also true that in piano playing, some fingers need to be held without moving in a high position for a long time, especially the 4th and 5th fingers. However, isometric exercises in general are more likely to cause injury than dynamic exercises, as they inhibit blood flow, and should therefore be used in moderation.

In the first picture, the third fingertip of the right hand presses down on the first (proximal) phalanx of the same finger in the left hand, whilst the latter pushes upward. The index fingers work in the opposite way. The pose is held for several seconds, without movement. The same fingers are repeated, swapping roles, then the whole exercise is repeated with each adjacent pair of fingers. For greater resistance, the fingers of one hand could work against the thumb and third finger of the other hand, as in the upper right hand picture. I have avoided using the fingertips to do the lifting work, as this would place an unnatural load upon the smaller finger joints. Instead of continuous exertion, repeated short presses can be used, relaxing momentarily in between, but again with no noticeable finger movement.

As an alternative to using the other hand, a bookcase can be used to supply the resistance, as shown in the lower left hand picture, where the index finger is pressing down on the books whilst the third finger pushes upwards against the shelf above. Some of the other fingers may rise unintentionally to a level even higher than the one in question. In this case, the finger can push up against a narrow block of wood attached below the shelf, with clearance on either side for the other fingers.

The poses can also be done without any external resistance, so that the muscles are simply working against the limit of stretch between adjacent fingers. For example, we can hold the index finger as low as possible, and the third as high as possible, continuously pushing as though trying to increase the stretch. Both fingers should be moderately curved. This would perhaps be the rationale behind the extremes of lift used by some members of the “raised finger” school when practising. However, the muscles will often be more or less fully contracted at this point, and will not have much pull in them.

It should be pointed out that the static positions held in many isometric exercises and Yoga poses are one and the same, although the spiritual dimension of Yoga is absent from the world of isometrics. In both practices, one set of muscles is being exerted and therefore strengthened, while another is being stretched.

These activities are not suitable for the thumb, as strong vertical thumb movements tend to cause a “bump” in piano playing. The exercises can be performed using the 2nd and 4th fingers together pressing upwards, whilst the 3rd and 5th press downwards, and vice versa, as shown in the “pen” illustration.

Working away from the piano can provide a refreshing alternative when conventional exercises no longer seem to be yielding significant progress. The exercises should not be judged on the basis of their immediate after-effects, which are the opposite of the long-term effects. In the short-term, the muscles in question will often perform *less* well than usual, simply because they are tired. After repeated use over a longer period, they will perform better than before, having gradually gained in strength.

The exercises may be seen as being "unmusical", but are no more so than many of the traditional finger exercises, which, although of immense value technically, produce sounds which have no musical qualities whatever. Having said all this, overuse of weight and resistance exercises should be avoided as it can result in a "lumbering" style of performance. A good pianist is more akin to a ballet dancer or possibly a racehorse than to a sumo wrestler or carthorse.

Working against a resistance is very strenuous, and should be approached with great care. Knowing how far to go is an intuitive judgement on the part of the individual, and cannot be quantified. As in many areas of life, from exploration to investment, reward and risk go hand in hand. The surest means of survival is to develop an instinctive awareness of the signals which our body is giving us.

It should also be remembered that a good piano technique is one which aims to achieve the best musical result, even though it may not be absolutely ideal from a medical perspective. Some of today's leading teachers seem to be so focused on the physiological aspects of playing that one might imagine the music to be completely irrelevant.

Unintentional complementary arm movements

In the case of many physical actions, the deliberate movement of one part of the body may be accompanied by unintentional, complementary movements in other parts. For example, many people may imperceptibly wiggle their hips when walking, but would never do so deliberately, unless they wished to be dangerously provocative.

We should be clear about which actions are done deliberately, which are simply allowed to happen, and which are deliberately prohibited. Arm movements are done deliberately when playing octaves and chords, when emphasising a melodic line (sometimes), and when a vehement effect is intended, each note being accented. Deliberate arm movements are also used to navigate the musical contours in passagework (p.6).

These include lateral, vertical, circular or rotary movements of the wrist which bring the hands into the optimum alignment for playing each group of notes. When playing *individual* notes in passagework, small-scale vertical arm movements are *allowed* to happen, especially in slow practice, although the conscious intention is directed towards the fingers. If we deliberately inhibit these movements, a stiff, awkward style of performance will result.

Similarly, the "withdrawal of arm weight" after the initial impulse of the finger stroke occurs naturally as a result of the key bouncing off its bed. If we deliberately induce it by applying a "braking action" or by withdrawing the arm, and awkward, "choppy" touch will result.

As we speed up a passage, the unconscious arm movement continues into medium speed but disappears in fast playing. In performing double note passages, the movement is more noticeable, and serves to counteract the increased upthrust of two keys played at once.

True, teachers faced with a pupil who plays each note with a *downward* arm movement instead of using the fingers would be well-advised to prohibit arm movements as a temporary measure. We should add that the upward arm movement is so slight as to be virtually invisible from the audience's perspective, which is probably why it has often been overlooked.

Forearm rotation

Another unintentional complementary movement is the "rotation" of the forearm in playing tremolo octaves,

broken chords, trills, and in accenting the 5th finger when it performs a "stabbing" staccato action. The hand tilts to the right for the higher note, and to the left for the lower one. Such passages should be practised slowly with a strong finger action, without rotation. Only when high speed is reached, should the wobble be *allowed*, but not forced, to happen. It serves to relax the arm, and enhances the musical effect. It can be practised, at high speed, using exercise 7 section 1, with every pair of fingers except the thumb. This is not the same rotation as in the wing action, where the arm flicks out then in for each single note, as opposed to a pair of notes.

There are a number of "relaxation methods" in which forearm rotation and similar movements are used as a *substitute* for finger work. Whilst such methods may have some benefits for people with injuries, they can never be considered as a means of achieving a clear, precise and effective playing style. In this respect, it is important to distinguish between those with and without injuries. Just as someone with perfectly sound limbs will not benefit from using a walking stick, so people with healthy fingers have no reason to go through all manner of contortions in order to avoid using them.

Other unintentional arm movements

When a pianist's arms fly into the air after playing a loud chord, this may look like a gesture of empty display, but is in fact a natural "follow-through" to the upward thrust of the wrist, just as when a tennis player or golfer follows through with their stroke, rather than stopping it abruptly after hitting the ball. Rocking from the hips allows the shoulders, elbows and wrists to move without changing the hand position, and serves to release tension. Holding the body in one position is always more tiring than moving it, just as standing still is more tiring than walking. This is because when holding a static position, a certain set of muscles is being used in a particular way for a prolonged period of time. When we move, the load is passed back and forth between different sets of muscles. In summary, whilst superfluous or theatrical mannerisms are certainly to be avoided, a variety of unconscious movements can be helpful both from a technical and expressive standpoint. Pianists who hold their arms and bodies absolutely still sound timid, lifeless and mechanical.

Practice methods

General points

The ideas in this section are well - known, but are included as so many people lack any methodical approach to practice, and simply use the time for playing pieces at full speed. The methods suggested are unashamedly rigorous, since, in the world of piano study, there is sometimes a tendency towards vague instructions where too much is left to chance, particularly as regards fingering.

It is true that talented people can reach a certain standard by simply playing through pieces in the manner of a performance. However, at some point they will "Hit a wall", whereby their playing is unable to advance to a higher level. The most difficult passages will always elude them, and even more modest sections will be untidy and approximate, with a great deal of fine detail missing. It is at this point that they will have to make the painful decision to go back to square one, adopting a slow, methodical approach. In the same way, reliance upon intuition can achieve wonderful results, but it can also desert one. An understanding of the underlying physical principles behind the intuitive skills can enable people to retain or regain them.

Concentration and alertness are all important. For this reason, the morning is by far the best time to practise, where circumstances permit. Demanding mental tasks, including memorization and fingering, should be done at this time. The late afternoon and evening are second best, and the early afternoon is worst, when the mind is clouded.

If concentration begins to fade, it is advisable to take a short break and do something completely different, or to change to a different mode of practice, for example slow practice of pieces, technical exercises, memorization, sight reading or improvisation.

Keep a written record of what you are currently practising, including sections covered, speeds reached and other details. I use a sheet of A5 paper with a soft pencil, and continually rub out and update items.

Begin your practice session with technical exercises, scales, arpeggios and studies, then move on to pieces. I always begin with stretching exercises (p.42-3), followed by very slow held exercises from Leschetizky (p.59), which warm up and stretch the fingers, then move on to more rapid work.

Writing fingering on the score is the foundation of good practice, and should be applied to every note except perhaps where a phrase is immediately repeated. A soft pencil is ideal for this purpose. The student should work ahead and have the fingering checked by the teacher before practising it. Some guidelines for fingering are given in the next section (see p.54).

Initially, you may wish to go through a bar or phrase at a time, with each hand separately then together, working out the notes. Fluent sight-readers may skip this stage.

For pieces, take roughly a page a day for slow practice. Try to make it coincide with a musical section in the piece. Practise slowly and firmly, with a finger touch or the wing action, as appropriate.

Starting slowly and speeding up

The metronome is a very effective way to bring discipline and structure into the practice routine. It enables us to practise pieces and exercises slowly, and then speed them up by gradual increments. Begin at the following metronome speeds for the shortest time-value occurring regularly in the piece (usually a semiquaver or quaver): 66 80 96 112 2 x 66 2 x 80 2 x 96 2 x 112 4 x 66 etc.

It is of course much more difficult to play with hands together than separately. Therefore any practice regime which gives as much time to working with hands separately as with hands together is inefficient. The above speeds could be used with hands separately then together, but some of the intervening speeds (69, 72, 76, etc.) can be used with hands together only. Having reached a certain speed on one day, it is advisable to backtrack to a somewhat lower speed the next day, and, using hands together only, work up to the speed in question, before proceeding further in the normal way.

Once the piece has been brought to full speed and memorized (see p.51), several further speed - ups with hands together, starting at about half-speed, are to be recommended. These can be played from memory, and also sometimes with eyes closed. It is also helpful to play one hand whilst "shadowing" the other on the surface of the keys, and vice versa, always from memory. This can be combined with the speeding up process, with the hands alternating for each increase in speed. A stage beyond shadowing is to play one hand whilst simply *imagining* the other hand.

When practising difficult, complex pieces, it is advantageous to work gradually up to a speed faster than the real tempo of the music. In this way the reactions are sharpened to a point where performing at the normal speed will be relaxed and effortless. Having attained such a giddy speed, the student should not be tempted into *performing* the work at this pace, as though to prove that they are capable of it. Too often one hears music played too fast, which, like a speech recited at a ridiculous pace, has lost all sense of meaning.

As full speed is approached, the increments on the metronome should be decreased, sometimes reaching as little as one notch at a time. For slow, complex pieces, start at a very low speed and increase by very small increments. The metronome can be left ticking the whole time, or, alternatively, it can be used to set the speed initially, and to check it periodically, but otherwise switched off. This encourages the player to develop a steady sense of pulse, and allows the notes to be heard more clearly. Practice should never be a matter of mechanically putting fingers down without listening to the sound produced.

Whilst slow practice is of great importance, we should also spend a significant amount of time practising quickly. As already mentioned, the rationale behind practising is that the body and mind gradually adapt to demands which are consistently made upon them over a long period of time. Therefore, if we wish to play quickly, we must also practise quickly! Given that a passage played slowly takes up much more time than the same passage played fast, it can easily happen that nearly all our practice time is taken up with playing slowly. In this case, we should reduce the number of repetitions at a slow pace and increase those at high

speed.

Careful and methodical work is essential, but taking it to excess can be counter-productive. Working for too long at the slowest tempo, going over easy sections unnecessarily or playing from the score even when the piece is securely memorized, have a stultifying effect. The same approach does not work for everybody. Gifted people will be able to able to progress much more rapidly than others, and will in fact be held back by an excessively pedestrian teaching method.

In the digital age, many accomplished pianists are tempted to add large numbers of very easy pieces to their repertoire, simply for the sake of having new material to present to their audiences at frequent intervals. In doing so they are placing short-term rewards ahead of long-term satisfaction. The mind and body should feel challenged if progress is to be made.

Playing fairly short, fast passages is quite easy, as the work is divided between ten fingers, so that no one muscle has to repeat its action in quick succession. The problems arise either in long passages where endurance is required, or in very rapid ornaments, trills for example, where each finger repeats its stroke several times rapidly. Awkward ornaments can ruin an otherwise impeccable piece of Bach. To build up endurance we can divide a passage into rapid groups of notes, as explained on page 53. For the ornaments, the "fast twitch muscle fibres" come into play. These are to some extent developed by slow practice, provided that we use the sudden, "explosive" finger strokes described on p.5, but are also greatly enhanced by performing several bursts and full speed, with short rest periods in between, during which the other hand could do something similar. In any physical training, a short rest period enormously increases the intensity of physical effort which one can put in to each burst of activity. Exercises 10 a, b and c are suitable for this purpose. Also practise trilling as fast as possible for as long as possible with each pair of adjacent fingers.

When the first pair is exhausted rest the hand whilst practising the same pair in the other hand. Begin the trill with the lower note, and also with the upper note, so that a different finger takes the more accented note (although we try to keep the notes as even as possible). It will be found that the thumb and second finger, and the second and third fingers, can go on for much longer than the outer fingers. It should be stressed that simply going through the motions of playing these exercises in a relatively effortless way will achieve very little. They should be performed energetically, until the muscles are tired. See also p.21.

For velocity playing we require not only strong muscles but also ability to "imagine" the music flowing rapidly in our "inner ear" and to transmit this instantly to the fingers via the neuromuscular system. When playing rapid and complex music, the mind is often "behind the curve", particularly as regards fingering.

This can be remedied by mental practice (see next section), which can be gradually speeded up in the same way as our physical playing. Whilst it is quite easy to imagine the notes flowing swiftly, it is more difficult to picture which finger is playing each note, so we should speed up the complete mental picture including fingering. It is not difficult to hear a tonal piece with a recognisable melody "in our mind's ear". However, a rapid progression of dissonant, atonal harmonies is a different matter! Here we can use the metronome to speed up our mental practice of the passage, away from the piano, hearing the harmonies, seeing the notes on the score in our photographic memory, and feeling the exact fingerings on our "mental keyboard". Theoretically, it should be possible to reach a higher speed with the mental practice than with the real performance, as there are no physical impediments to negotiate. However, it usually proves to be the other way round, perhaps because the physical act provides the brain with a peg upon which to hang its thoughts.

The best way to bring the mind "up to speed" is to gradually speed up both the mental practice and the normal playing from memory to a tempo which is *well beyond* the real speed of the piece. This will render performance at the correct tempo relatively effortless both mentally and physically, and will help to remedy two of the main causes of anxiety in performance, namely fear of memory lapses and fear of playing wrong notes. The speeding up should be done with hands separately and together, using the metronome, as before.

51.

Memorization and mental practice

All other technical matters pale into insignificance compared with the fundamental task of learning the music! The best way to do this is by memorizing it. In difficult pieces, it may be impossible to reach the higher speeds without first memorizing the music, or at least the most difficult sections. In general, though, the speeding up process with the metronome (see previous section) should precede the memorization, otherwise mistakes will be memorized.

Memorize everything. It focuses the attention and stops the mind wandering. "***Mental practice***" (i.e. going through the music in your mind paying attention to every note, including its fingering, but without playing it) is even better. This should also be done with each hand separately then together. When we play, we first "imagine" the music in our "inner ear" and then transmit this to our fingers via the neuromuscular system. Even in sight-reading, we "inwardly hear" the music which we see on the page, and then play what we are inwardly hearing! In the same way, a composer hears music inwardly and can translate this either into playing or into a written score. There is an intimate link between the written symbol, the inner ear and the fingers on the keys. This can be developed by mental practice and also by aural training and musical dictation. Closely allied to Yoga, mental practice is very soothing, and also offers a wonderful way in which to make productive use of time which would otherwise be wasted, for example when waiting for trains.

Needless to say, the music must be thoroughly memorized before mental practice can take place. However, the mental practice itself will also greatly reinforce the memory.

The following scheme can be used to memorize a piece: Go through the whole piece in 4 bar sections (or equivalent phrases), then go back to the beginning and do it in 8 bar sections, then 16 bars, 32 bars etc.

Mark the sections in the score with a pencil. For each section, do the right hand in the following way:

play it twice with the music
once by "mental practice"
once from memory
once again with the music to check
once again from memory

Repeat the above steps with the left hand. Then do the right hand and left hand once more from music and once from memory, then repeat all the above steps with the hands together. During all these repetitions of phrases and sections, do not play in a mechanical way, but pay attention to phrasing, dynamics, touch and expression. It may also be possible to increase the speed during the repetitions. Anyone who has memorized a piece in this way will realize how sketchy and superficial their knowledge of it was beforehand.

This process is most effective when done intensively, i.e. by practising long hours over relatively few days, preferably not too long before the first performance. Whilst one hopes not to have a memory "like a sieve", nevertheless even a good memory is like a bucket with a small hole in it. By filling it quickly, we can hope to have a full bucket before too much leaks away. On the other hand, one should not continue practising until the point where the mind is overloaded and nothing is retained. It is advisable to alternate memorization with technical practice so as to rest the mind now and then.

A rapid read through each hand of a short section, without playing, is valuable. Here, we are capturing data rather than music, for example, the appearance of the notes on the stave, fingering and similar "peripheral" matters. If, for example, two phrases begin with the same note, this can serve as an "aide memoire", and can be marked in the score. Visual memory of the score goes hand in hand with auditory memory. When performing from memory we often visualise the position of the current passage on the printed page.

Once a repertoire of memorized pieces has been built up, these should be played through on a regular basis. A checklist in the form of a spreadsheet is helpful. In addition, each piece should also be re-worked from time to time using the speeding-up method described above. If any pieces have been left un-played for a

long period, in may be necessary to re-memorize them in sections using the procedure described on page 51, otherwise confusion will set in, particularly as regards fingering.

Musical attention

When playing, our attention is focused in many ways, partly on individual notes, partly on phrases and partly looking ahead to the phrase that we are about to play. We are conscious of the sound, of physical sensations in the fingers and arms, of spatial awareness and of our visual memory of the score. At the same time we may also be doing a number of things automatically, like motorists who suddenly realize that they have arrived home, even though they were entirely unaware of the journey, as their mind was "somewhere else". Just as with visual focus, we may speak of a "centre of attention" and of "peripheral attention". As our knowledge of a piece matures, the centre of attention will move towards the musical message, with such matters as notes and fingering increasingly consigned to the peripheral area, or to the "automatic" function. Most importantly, in practice and performance, we should eliminate superfluous elements form our consciousness. These would include extraneous issues which may be on our mind, fear of the audience and above all, personal vanity and egotistical display.

Attention and memory are intimately connected, as it is clearly impossible to remember something of which one was unaware in the first place. This happens in everyday life with actions that are so much a matter of routine that they are performed automatically without being noticed, which is why people often have to check twice to see whether they have turned off the heater, filled the kettle and so on. During the initial phase of learning a piece from the score, we need to focus intently upon the musical line, banishing other matters from our consciousness. In this way we will be able to remember the music clearly afterwards.

In an era in which we are constantly bombarded with brief messages from different sources, it becomes difficult to focus the attention on one task for a prolonged period. The practice of concentration, in the form of Yoga Meditation, Mindfulness or related activities, is of great value in developing this discipline. Mental practice as described above is one such, and forms a perfect means of directing our mind towards the evolving musical discourse. Just as the driver constantly steers so as to follow the course of the road, so we need to steer our consciousness along the course of the music, never allowing it to wander off on to side tracks. The lightning reactions of concert virtuosi bear witness to the need for a state of heightened awareness in musical performance.

Attention can be focused on something which is static, for example a picture, or moving and evolving, as in a piece of music. It can be directed outward towards a sensory input or inward towards something remembered or imagined. In the case of mental practice it is focused on an evolving, remembered entity.

Even a relatively short practice session with full attention is worth many hours working in a state of reduced alertness. With this in mind, a healthy lifestyle and plenty of sleep are vital elements in piano study. A mindset similar to that of aspiring sporting stars is more helpful than the somewhat derelict image often associated with romantic artists. It should also be mentioned that, in the case of an inadequate technique, the sheer physical discomfort and effort of performance can occupy a large part of the player's awareness. This problem can of course be solved by means of effective practice methods and suitable technical exercises. A further unconscious distraction can be pain or fatigue in the muscles of the back. In this case, a good deal of the player's energy is being diverted into simply remaining in an upright position. A few minutes spent lying flat on one's back will provide relief. This time can be used productively by going through the music using mental practice.

Some modern methods have emphasized the mental aspect of technique to the point of denigrating the physical side. I would argue that *both* are essential, and are indeed mutually interdependent. Just as the body is unable to accomplish anything without a focused mind, so the mind is unable to realize its intentions without a well-trained body. It is easy to mentally visualize jumping over a house, but doing it is a different matter. It is also worth mentioning that physical training includes many different aspects, requiring varying amounts of mental input, for example, strength, speed, endurance, stretch between the fingers, aiming for the keys, co-ordinating complex fingering patterns and emphasizing certain notes whilst subduing others.

Finally, it should be mentioned that individual differences play a part. People who are endowed with brilliant minds without being particularly strong physically will need to work harder on the physical side, whereas for others, the reverse may be true.

Special techniques for difficult sections

It is very important to focus on the difficult sections, since otherwise we may waste a good deal of practice time on easy parts which we can already play perfectly well. Nevertheless I would issue a warning concerning some teachers who become so obsessed with the difficult sections that the pupil hardly ever plays through the piece in its entirety. In this way they will lose sight of the musical argument and will come to see the piece as an obstacle course rather than as a vehicle for artistic expression.

Memorize the difficult sections before the rest of the piece, and play through them several times from memory every day thereafter. Run through them by "mental practice" (p.51) at every opportunity. Having memorized the whole piece, play it many times from memory with hands separately and together, taking special care to retain the left hand in the memory. Sections which are still causing problems should be listed and practised separately. Run through them all at the beginning of each practice session. Work on the difficult sections using some of the following special techniques:

First, go over the difficult section again very slowly and speed it up with the metronome. Re-memorize it if necessary. Then, try to diagnose what the technical problem is, and use some of the ideas explained earlier in this guide to remedy it. For passagework, the following are standard techniques:

Practise in different rhythms, for example, dotted quaver / semiquaver, and the reverse. For the long notes, the arm bobs briefly up and down at the beginning of the note then "hangs" from the key. To achieve the "reverse" rhythm, simply play the first rhythm, starting a note later. At a slow tempo it is even more effective to use a double dotted rhythm, similar to a French Overture.

Divide it into groups of two, three or four notes. Play these as phrases, dropping arm weight on to the first note with a down wrist and lifting it out on the last note with an up wrist. The phrases can be unaccented or accented on the last note. When using a group of a certain length (e.g. 3 notes), initially begin the first group on the first note of the passage. Next time, begin on the second note, and finally on the third. This type of practice does not need to be done slowly. Begin at a moderate speed and work up to very high speed.

Divide into groups of two rapid slurred notes, the second being played staccato and accented (See ex. 10).
Passages requiring endurance, particularly rapid octaves, can be practised first in groups of three, separated by rests, during which the muscles can recover, then gradually increasing the length of the groups to 4, 6, 8, 12 and 16 notes. Rapid practice of an octave scale can be alternated with rapid practice of fingered passagework, so as to give one set of muscles a rest while another is working.

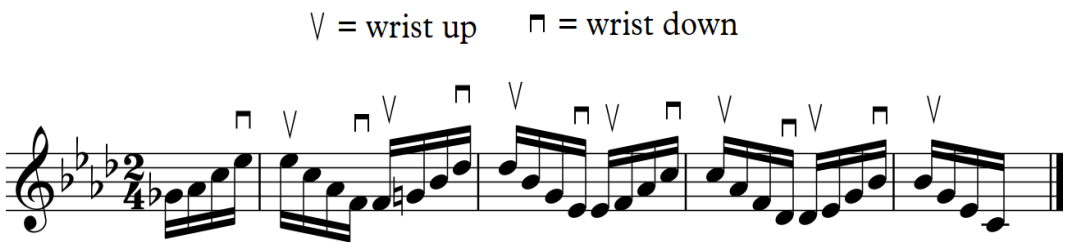
Use "adding notes": i.e. play the first note, then the first two, the first three, and continue adding a note at a time, but always starting at the beginning of the passage. As with phrases, weight is introduced by dropping on to the first note with a down wrist. The groups can be done unaccented, or alternatively by playing the last note reached each time with an accented staccato.

Play the passage normally, but accenting every second or third note (see p. 25).

Practise the passage with a double hit on each note. This may be unaccented, or with an accented staccato on the second note, or with the first note accented and the second note sustained.

Where there is a difficult leap across the keyboard, practise alternating between the notes on either side of the leap. Repeat the process with your eyes closed. Where there is a leap, or indeed any change of position, after a rest, the hand should move immediately into position *before* the rest, and wait there. For rapid leaps, play the note before the leap staccato, as this allows more time to negotiate the leap.

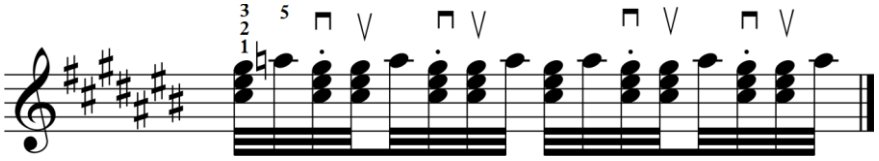
Where the same note is played twice rapidly, play the first note staccato. Use a different finger for the second note. Play unaccented, or with the second note accented using a stronger finger thrust. There may be a downward wrist movement of the first note, and an upward one on the second. This will often be on a very small scale, as in the following example from Bach's Prelude No. 12 in book 2 of the 48 Preludes and Fugues, bars 20-24.



Exaggerating the wrist movement renders it cumbersome and inefficient. It almost falls into the category of movements which are allowed but not deliberately induced (see p.46). One can think of a passive wrist which is kicked upwards by the stronger finger stroke on the second note.

When a note has just been played, it takes a little time for the key to rise and for the hammer to return to its resting position, so it will be difficult to repeat the same note immediately. The second time it is played it will sound quietly or not at all. By playing the first note staccato and accenting the second note with an upward wrist movement, we are giving the second note the best possible chance of sounding (see ex. 12). By changing the finger we avoid the problem of one muscle having to repeat its action rapidly.

This may not always be possible, particularly if the repetition involves a chord, as in the opening bars of Ravel's Ondine, shown below. Here, a microscopic rotary movement between the first three fingers and the 5th finger will help:



It is always easier to play a repeated pair of notes if the accented second note falls on a strong beat, as in the Bach example above, or as in Beethoven's Sonata Op. 31 no. 2, first movement, bars 2-18. Where this is not the case, the notes can sometimes be mentally re-grouped. For example, the above passage from Ondine can be thought of as a Calypso-like 3, 3, 2 instead of the notated 4, 4.

It should be pointed out that when applying the above special techniques, we should select those which are appropriate to the problem in question, rather than going through the whole list of techniques. To do so would be like a doctor who gives the patient every medicine on the market, in the hope that one will be effective. For example, when trilling between the fourth and fifth fingers, the notes played by the fourth will tend to be too long. Therefore we should practise the trill in a dotted rhythm, with the fifth playing the longer (dotted) note. We should *not* reverse the rhythm, as this would simply exacerbate the problem. (See Exercise 9). Unevenness occurs when the transition between two notes in a passage is difficult. This transition will take longer than the rest, so that the first of the two notes will appear long. We can remedy the problem by practising a short section of the passage including the transition in a rhythm in which the excessively long note is now shorter than the others. Also practise the transition as a grace note.

Where one note accidentally sounds *quieter* than the rest again practise a short group including the surrounding notes, this time *accenting* the weak note. Repeat the short phrase many times without stopping. This will often be a note played by the 4th finger, especially if it is situated between two black keys, as in the progression F# G Ab played by 3,4 and 5. Here the key is struck in a forward position where the touch is heavier.

If you frequently mis-hit or "fluff" a particular note, check whether you are catching the one above or below

it, and adjust your aim accordingly. It may be that the thumb is not being passed far enough under the palm in an arpeggio, for example. Always “prepare” the note in slow practice by positioning the finger vertically above it before playing.

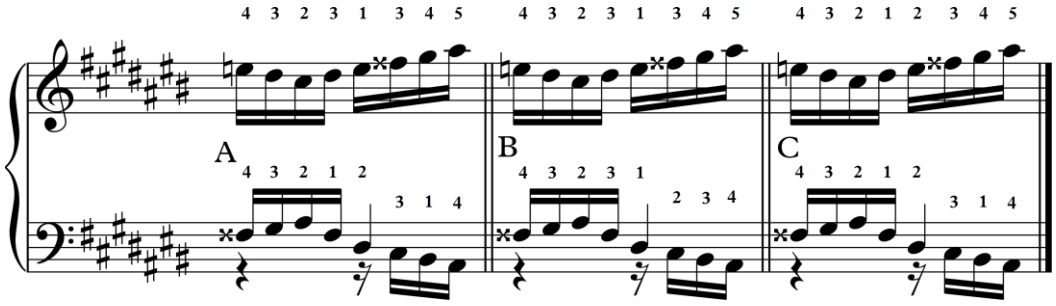
Fingering: Some general points

As already mentioned, the importance of writing in fingering cannot be overstated. For any given phrase, several fingerings are possible, and if the fingering is not written in, the pianist may use a different fingering every time, and will end up with confusion instead of a clear sequence of action. Relying on the editor’s fingering is to miss out on an important stage in the learning process. Fingering is one of the few aspects of our work which makes high demands on our problem-solving and decision-making faculties. In this respect it differs from rote memorization and slow practice of pieces.

In order to establish the fingering, play through each phrase several times with each hand separately, trying several fingerings, and deciding on the best. This will often be a compromise between a number of factors, listed below.

Fingerings which work well at a slow tempo may prove to be impracticable at speed. Therefore try to play the phrases at something like a realistic speed when determining the fingering.

Sometimes, a fingering which may not be quite the most comfortable for one hand, is nevertheless easier for the co-ordination of the two hands. Therefore, fingerings should be tested with hands together as well as separately. An example is the passage below from bar 54 of Fugue no. 3 from book 1 of Bach’s “48”. Option A is good for each hand in isolation, but makes co-ordination very difficult. B is good for co-ordination, but requires an awkward thumb crossing in the left hand. C is probably the best option, as is good for co-ordination, with a symmetrical fingering in both hands for the first six notes, and has no very difficult thumb crossings. When playing it, think of groups of 3, 3 and 2 semiquavers.



Fingering A (above) follows pianistic convention rather than common sense. For example, when learning scales for examinations, we often avoid playing the two thumbs together, except on the tonic, as this would create a “bump” on the note in question. However, in real music, a very small bump is greatly preferable to having one’s performance ruined by being constantly tripped up due to an awkward fingering.

When the thumbs are placed on an unaccented note, as above, they may even create a pleasing syncopated effect, to which Bach might well have had no objection. A further convention is to avoid using the thumb on black keys. This has some truth, as doing so forces the hand into an uncomfortable forward position. However, other considerations, as in the present example, will often override this rule. Be on the lookout for passages like the above, as it only takes one of them to spoil an otherwise straightforward piece.

When fingering repeats, use the same fingering. Where possible, also use the same fingering for phrases repeated at a different pitch, as in sequences, development sections and recapitulations. This makes memorization simpler. However, if the change of pitch results in an awkward or clumsy fingering, this will have to be changed.

It is sometimes conceptually helpful to divide a continuous passage into smaller groups of notes (usually 3, 4 or 6), each group having the same fingering. However, this may result in some awkward hand positions,

usually due to the thumb falling on a black key. The advantages and disadvantages of this approach need to be weighed in each case.

Sometimes, a fingering which is less smooth or efficient mechanically is more suited to the expression. For example, when a dramatic "bump" is required, it may be better to repeat the same finger. The start of a new phrase may also benefit from a less smooth fingering. Pianists who aim at a perfectly seamless texture will produce music which is amorphous and lacking in expression.

A fingering which is the most efficient mechanically may be so intricate and convoluted as to lead one to trip up in performance, and should sometimes be replaced by a simpler fingering. For example, a trill can be played simply by alternating two adjacent fingers, e.g. 232323, or with a more complex fingering such as 13231323. The latter reduces fatigue as the muscles do not have to repeat their action so frequently, but is mentally more demanding, particularly if the other hand is playing a complicated part at the same time.

For octaves, use 5 on white keys and 4 on black, unless there is a very good reason to do otherwise. This greatly simplifies memorization, as we know in advance which finger to use. The slim fifth finger can easily miss or slip off a narrow black key. People with small hands may have to use the fifth throughout.

Changing fingers whilst holding one note is an undesirable and messy practice, but is occasionally unavoidable. When it occurs, it is better to get the change over with as early as possible. This normally involves the 4^{th} and 5^{th} fingers, and can sometimes be avoided by "walking" the 5^{th} finger behind the 4^{th}.

We memorize fingering together with the notes, so making numerous revisions to fingering can be confusing. However, if we have a "brainwave" about the fingering of a certain passage, the new fingering should be written in and the section in question thoroughly re - memorized. The "brainwave" will often consist of taking certain notes with the other hand, so always be on the lookout for this opportunity.

Pianists with weak 4^{th} and 5^{th} fingers will sometimes resort to complex fingerings with numerous thumb crossings and changes of position in order to avoid using these fingers. Those with strong, independent fingers will be able to avail themselves of conceptually simpler fingerings.

Editors are by no means infallible. They have been given the task of writing fingerings for a large quantity of music within a limited time frame, and may well have only a superficial knowledge of some of the pieces. The best fingerings can only be found by in-depth study, and sometimes only emerge after playing a piece for many years. Beware also of those editors who, as though in an effort to justify their own existence, dream up all manner of wonderfully intricate and convoluted fingerings which are entirely unnecessary and guaranteed to trip people up under the stress of performance.

The pedals

Almost all practice should be done *without* the pedals. They are added only in the final stages. Covering unevenness or discontinuity resulting from poor fingering or lack of practice by means of the sustaining pedal is definitely a sin. On the other hand, a well-played *non legato* with pedal added to give a "quasi legato" effect is perfectly legitimate, and is in fact what most concert pianists do most of the time. There are also occasions for playing staccato with pedal (see page 27). The pedal is of course not only used to sustain sounds but also to allow sympathetic vibrations in other strings, thereby creating richness of sonority.

Half-pedalling is of great value in sustaining notes without excessively blurring harmonies. We press the pedal roughly half-way down then move it intuitively just as one uses the accelerator pedal of a car. It is helpful to write in pedal marks, but not to excess, as it is a very subtle and intuitive art, and also varies with different pianos and the acoustics of the room.

The use of the *una corda* pedal is well-known, and does not require mention. The *sostenuto* or middle pedal, which sustains only keys which have already been pressed, is much neglected, partly because many pianos do not have it, because very little music has been written for it, and because it is often out of alignment and

poorly adjusted. However, it can be added by the performer, especially for sustaining bass pedal points, without being indicated in the score. It can also be used in improvisation to sustain bass notes or octaves which have been pressed *silently*. This creates wonderful organ-like sonorities when higher keys are played which are within the same harmonic series as the bass notes. Using the sostenuto and sustaining pedals together is a dangerous game, which should be done carefully! If the sostenuto pedal is pressed while the sustaining pedal is already down, it will sustain every note on the keyboard, creating an unbearable cacophony. Maintain firm pressure on the sostenuto pedal. If it is released slightly by accident and then reinstated, it will sustain notes other than the intended ones.

Analysis

We analyse the music in order to understand the composer's intentions. Piano practice entails a great deal of patient and repetitive work, which can cause people to "switch off" mentally. Instead, we should always be on the lookout for features of musical interest and for patterns which will facilitate memorization, annotating the score where necessary. Sections which are repeated with small changes, for example in recapitulations, are especially difficult to memorize. Practise the changed phrases side by side, making a mental note of the differences. Atonal, discordant music is particularly difficult to memorize, but some understanding of the structural and harmonic principles involved will serve to alleviate this problem.

Imagine someone reciting a speech in a foreign language with no idea of its meaning! Needless to say, it would also be very difficult to memorize a string of meaningless syllables in this way. Yet there are pianists who feel that if they have delivered the correct notes at the right time, their work has been done! Even so, one can have too many words! Inspiration begins where explanation ends. It is beyond verbal description. Further discussion of analysis is beyond the scope of this document.

Cultivating a natural technique

When using the term "natural", we should not allow ourselves to wallow in sentimental, animistic, Disney-like fantasies. Whilst only hardened Philistines would describe the instrument as "a wooden box with sticks for brains", this is perhaps no more misleading than the effusions of soft-hearted romantics who treat the piano as though it were their pet poodle, or those prim and proper pianists who can convert even the most dark, violent and wicked piece of music into something resembling a Sunday school picnic. To all the kind and gentle teachers who say "Never hit the piano!" I would point out that, regardless of what we do with the keys, whether it be hitting, pressing, stroking or caressing, the sound will be produced in exactly the same way, namely by means of a hammer hitting a string. Nevertheless, the manner in which we address the keys may serve to reinforce the artistic concept, both in our own minds and that of the audience.

We aim to cultivate nature, rather than fight it. The third "finger action" diagram (p.7) represents a slight departure from orthodox practice. It conforms with the physical nature of the piano as a percussion instrument with rebounding hammers, and with the natural rhythm of work. We strike the key then allow it to rebound slightly, rather than holding it to its base. This allows the finger and wrist muscles to relax before the next moment of exertion, by holding the key with a considerably reduced amount of pressure compared with that of the finger stroke. In a similar way, the drummer does not press his drumstick into the drum after striking, nor does the builder press her hammer on to the nail, but allows it to rebound, ready for the next strike. In the same way, the vibraphone player creates a continuous melody by bouncing the mallet off the metal bar and allowing it to ring on.

Some would argue that the sudden, explosive finger strokes recommended on p.5 of this book are "mechanical" or "unnatural". However, one has only to observe the jerky movements of many animals and birds in order to realize that nature is by no means always smooth and flowing. One reason why many creatures stay still most of the time then move suddenly and rapidly is in order to avoid detection by predators. It is hoped, however, that pianists will not find themselves in this situation.

The "cyclic" finger action also follows a natural motion sequence, similar to that of the legs in walking or running. Imagine trying to run with our knees and ankles held rigidly in a fixed position, moving only from the hips! Yet this is what many pianists do with their fingers. For this reason, one could ask pupils to "take a

walk" along the top of the piano with two of their fingers. Alternatively, hold the hand in front of you with the palms facing inwards and the fingers in a natural relaxed curve. Rapidly move the fingers 2345 several times in sequence as though playing notes with them, and observe the changes in finger shape. They will follow the "cyclic" pattern, creating a fan-like effect. The same is true in reverse order (5432).

The "extending" finger touch can also be observed in any untrained person typing at the computer. Designed by nature and refined by evolution into highly intelligent operators, capable of performing a multitude of delicate and intricate tasks, the fingers are able to negotiate their way around the labyrinth of black and white keys with deftness and agility. By holding them in a rigidly bent position, we place them in a straightjacket, hampering their movements and stifling their natural intelligence.

The "wing action" (p.33) exemplifies the adaptation of nature to the needs of keyboard playing. It will be noticed that nothing has been said about "economy of movement". What matters is not restricting movement, but moving in the right way at the right time. Economy can easily turn into a straightjacket, and when we restrict movement, we restrict expression. Examples of harmful forms of economy include methods which exclude hand and arm participation, prescribe a fixed finger shape or insist that the fingers be kept close to the keys. Such methods lead the pianist into an inhibited and unadventurous frame of mind. Having said this, however, it is obviously better to exclude actions which serve no musical end, and whose sole purpose is visual display. In addition, there are some leading soloists whose apparently contrived facial expressions seem designed to draw attention to themselves rather than to the piece which they are playing. This is extremely counter-productive, as the aim of performers should be to efface themselves both from their own consciousness and that of the audience. We should follow the example of the famous pop star who said that his job was to avoid getting in the way of the music.

It is good to practise in a way which is more difficult than the real performance, just as the famous orator Demosthenes used to rehearse his speeches with a mouth full of stones. Thus, we may practise with our eyes closed, using a higher finger action and more arm weight than necessary. We could also use strongly curved fingers which oblige us to stretch more at the knuckles. However, we must remember to relax into a more natural style in the performance itself, otherwise this will simply become an exhibition of tortures.

In music as in real life there is a natural alternation of exertion and relaxation. The gentler, quieter moments are not only vital from an artistic standpoint, but also of great technical value, as they allow our muscles to relax, so that they can give all the more in the fierce, impassioned climaxes. This natural ebb and flow of dynamics, even within individual phrases, brings music to life. Despite this, one often hears people "hammering through" a piece as though the sole objective were to reach the end! These pianists have made such a virtue of their vigorous practice method that they have carried it over into performance.

This guide is devoid of anatomical illustrations. The human brain thinks in terms of actions, not muscle groups. We think "I will push this forwards", not "I will contract my triceps". It is also helpful the think in terms of feeling sensations, in a sensory rather than an emotional context, just a singing teachers do, when they are describing various physical acts within the body which cannot be seen. For example, we can speak of feeling a lifting sensation in the forearm, or a feeling of pressure on the fingertips.

Technique is meaningless until it is applied to playing real music. When starting a new piece, first play through each phrase without thought, allowing the hands and arms to do what they intuitively find most expedient. The second stage is to observe and rationalise what is happening, so as to understand the technical processes being used. This is much more appropriate than applying a set of stereotyped a-priori rules. As Neuhaus pointed out, there are as many techniques as there are musical utterances.

Specialists can become blinded by their own science, to the point where they see technique as an end rather than a means. Even among professional concert pianists there are those who play in a thorough and business-like way, as though doing their duty with due diligence, but nothing more. This is perhaps because, in the meaningless merry-go-round of modern life, it is often difficult to connect with that magic realm, beyond the world of everyday trivia, which is the natural habitat of artistic inspiration.

Bibliography

The Leschetizky Method by Malwine Bree (1902). A good guide to the raised finger action and hand position, but lacking in detail about how to use the arms.

The Act of Touch in All Its Diversity by Tobias Matthay (1903). Very influential, especially in Britain, but not particularly recommended, as it has given rise to a good deal of confusion and bad practice.

Famous Pianists and their Technique by Reginald Gerig (1974). A long and interesting survey, particularly for the chapter on Ortmann and Schultz, who developed the "extending finger action", although they did not invent it.

The Technique of Piano Playing by Josef Gat (1958). Meticulously researched but too long and detailed for most people. It contains some good ideas and some questionable ones. Gat understood the function of kinetic energy in producing tone (op. cit. p.27) but did not understand the role of arm weight in creating the kinetic energy.

The Art of Piano Playing by Heinrich Neuhaus (1973). Full of wisdom and a pleasant read. Anecdotal rather than systematic.

Exercises and Studies

School of Advanced Piano Playing by Raphael Joseffy (G. Schirmer). An outstanding book. Probably the most extensive and comprehensive selection of exercises available.

Essential Finger Exercises by Erno Dohnanyi (Editio Musica Budapest). This book contains many excellent exercises, although some pages are devoted to things which can be found in a normal scale book.

The Virtuoso Pianist by Hanon (G. Schirmer). Simple sequential patterns, useful for practising different touches. Easily playable by people who find difficulty in reading music.

The Art of Finger Dexterity by Carl Czerny (G. Schirmer). The studies are quite musical, and, by virtue of their length, help to develop stamina. A good preparation for Chopin's Etudes.

Technical exercises by Paul White. Available via the following link:
www.scoreexchange.com/profiles/paulwhite743 A selection of representative exercises follows.

Exercises

To repeat a well-worn but very valuable saying of piano teachers, “What matters is not *which* exercises you play, but *how* you play them.” The following guidelines apply to almost all of the exercises on the pages which follow. Any exceptions will have instructions printed at the top of the exercise. Full details and an explanation of the principles involved can be found earlier in this book.

Use the given fingering. Some of the exercises could be played more easily using other fingerings, but this would reduce their technical value.

Using a metronome, start slowly and gradually speed up. I like to use the following speeds, referring to a single note, usually a quaver (eighth note): 66, 80, 96, 112, 2 x 66, 2 x 80, 2 x 96 *etc.*

There is no need to play with the hands together, unless otherwise indicated. Alternate the hands at each metronome speed.

Practise firmly (loud) using strong, rapid finger strokes even at a slow tempo, with raised fingers. Do not raise the thumb high, as this tends to be too loud in relation to the other fingers. The 4th and 5th fingers, which are weaker than the others, should be particularly well-lifted and brought down very firmly. Many of the exercises involve considerable stretches, both vertical and lateral, between the fingers, requiring strenuous exertion. This is perfectly in order. If they feel easy, they are doing no good. *At the same time, take care not to over-exert, otherwise injury may result! This is a matter of personal judgement, and cannot be quantified.*

Rest a moderate amount of arm weight on the keys whilst holding the notes. The arm weight should pull backwards rather than pushing forwards. It also pulls the wrists gently downwards.

Maintain a gently rounded hand shape, keeping the fingers curved even when wide stretches are involved. Experience a sensation of the fingertips tugging at the keys somewhat. This will prevent them from collapsing into a concave shape, and will also serve to counteract the backward pull of arm weight. The fingers remain moderately curved when they are raised. The 5th finger straightens as it approaches the keys, forming a pillar-like shape. This prevents the hand from sagging towards the outer side.

Use a legato touch in slow tempo, changing automatically to a non legato (detached) touch when higher speeds are reached, usually around 2 x 126 notes per minute. Many of the exercises are too difficult to take up to this speed, and should be played legato throughout.

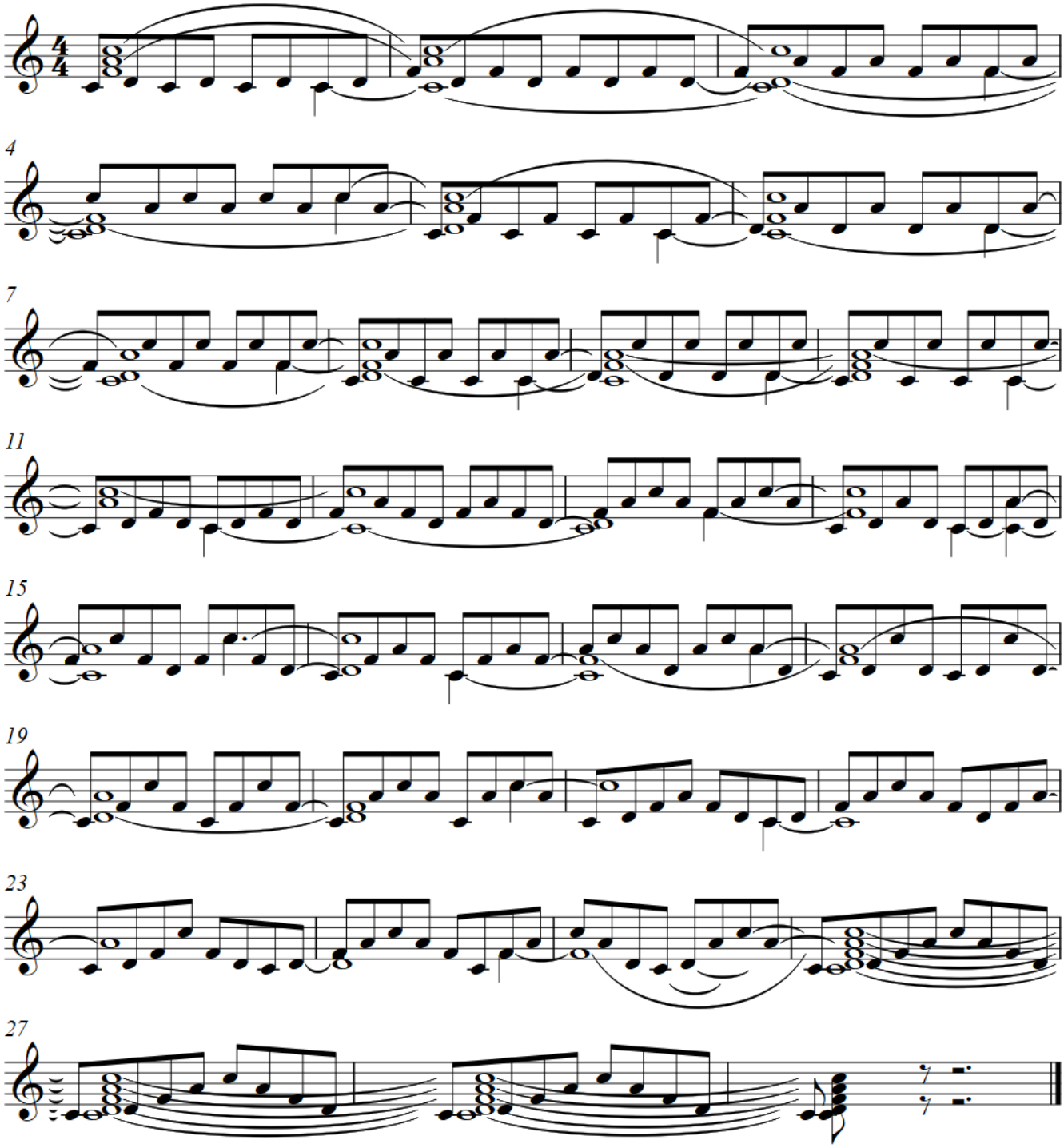
Aim for clarity and evenness of touch and dynamics. Do not use the pedals when playing exercises.

When a high speed has been reached, repeat each section several times as indicated by the repeat marks, until tired.

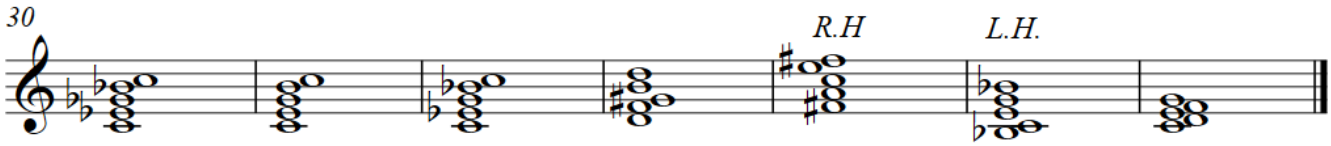
Once learned, the exercises should be played through at high speed on a regular basis. This will help to build stamina as well as finger strength and independence.

Exercise 1: Held Exercise

Practise slowly and firmly in a legato or non legato touch.
The fingers playing the quavers should be lifted high, apart from the thumb, which should only rise to key level. The remaining fingers should hold down their notes, but without excessive pressure. The fingers should be kept curved when playing on white keys. The exercise can be repeated using any other 5-note chords. A feeling of non legato can be created in the following way: a fraction of a second before playing each note, the finger due to play the subsequent note should be raised.



Repear the exercise using the following chords:



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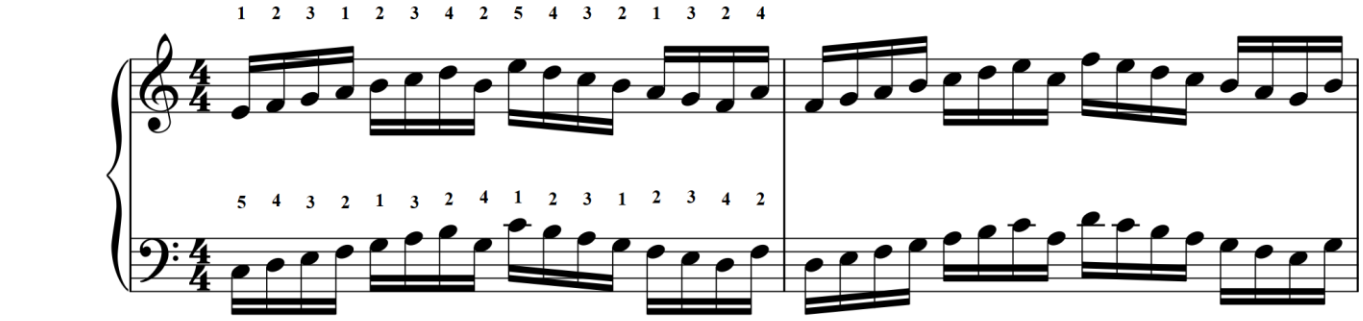
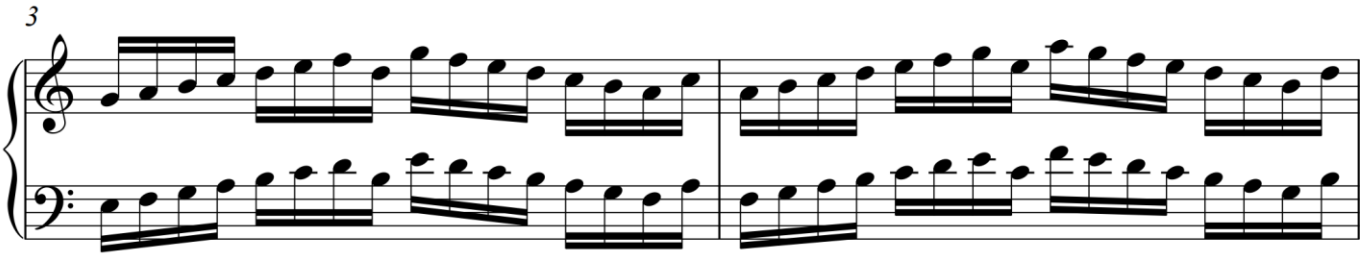
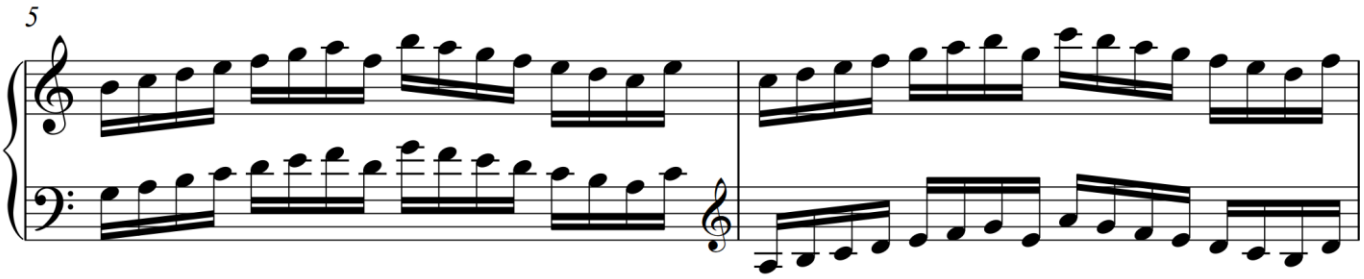
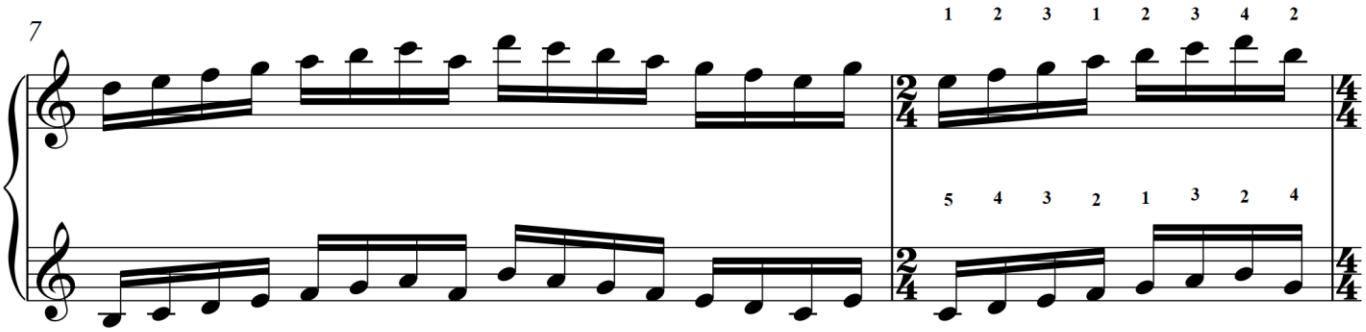
Exercise 2a: Free Exercise

The fingering indicated should be repeated in subsequent bars.









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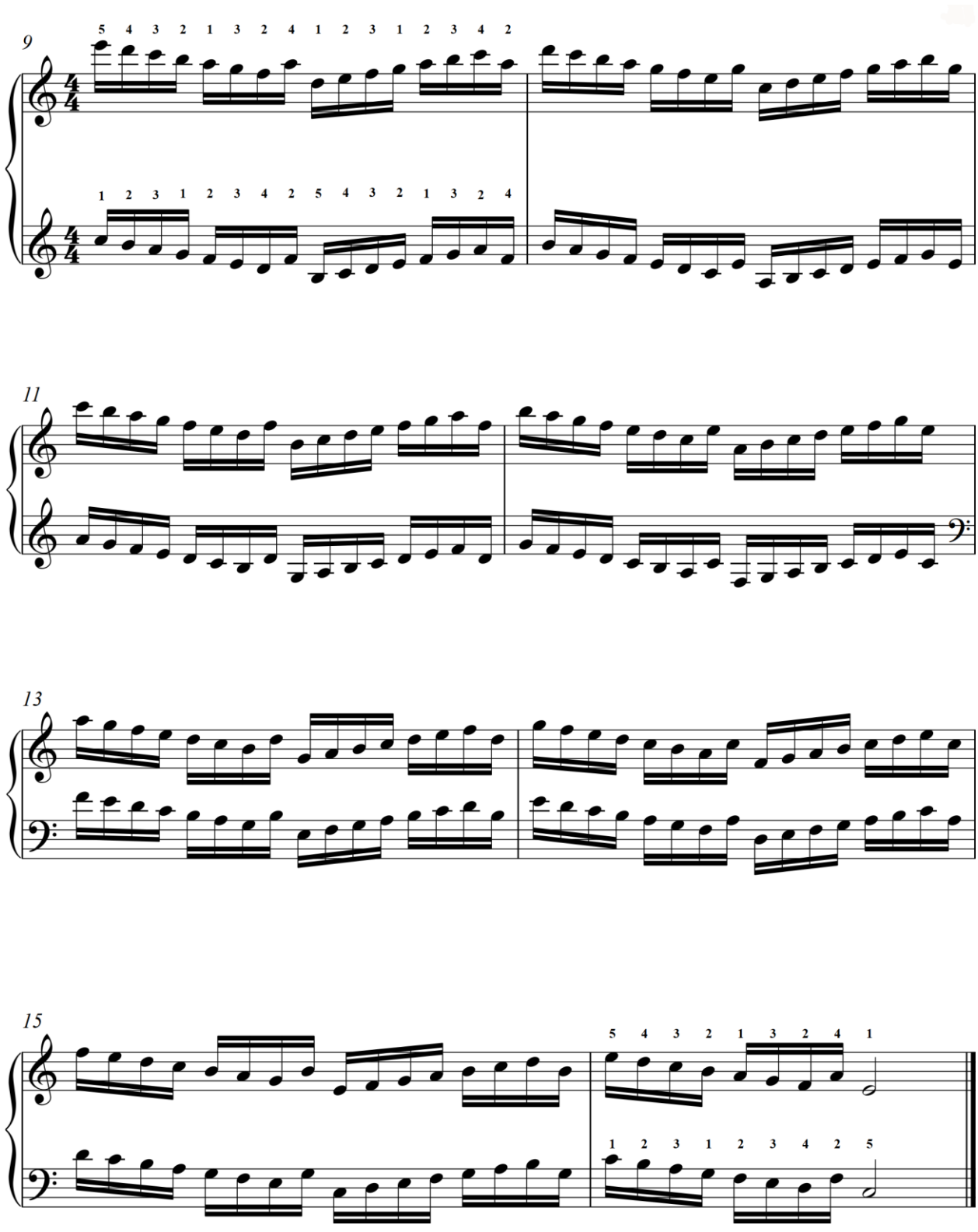
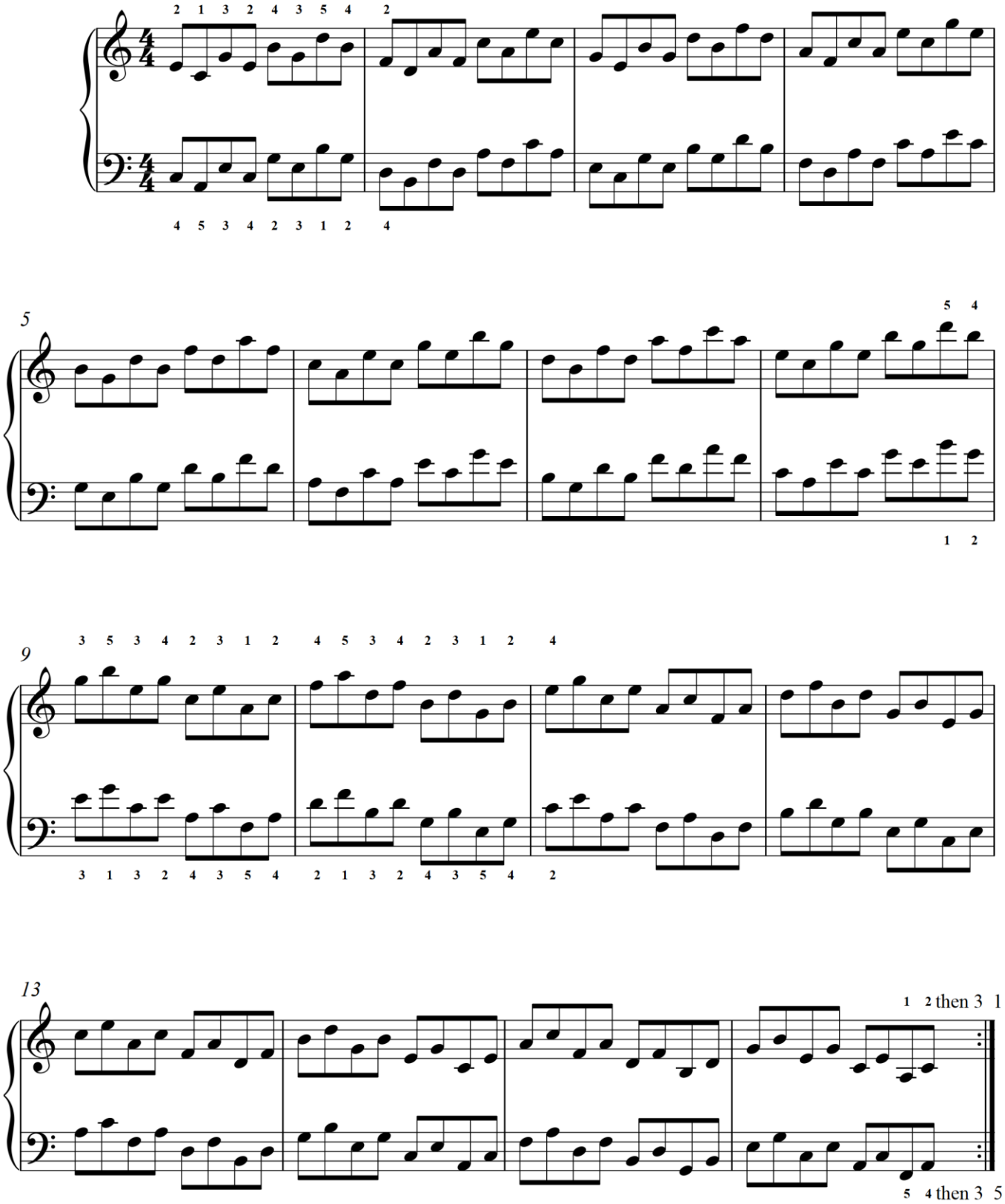
Exercise 2a page 2



Exercise 2b: Free Exercise



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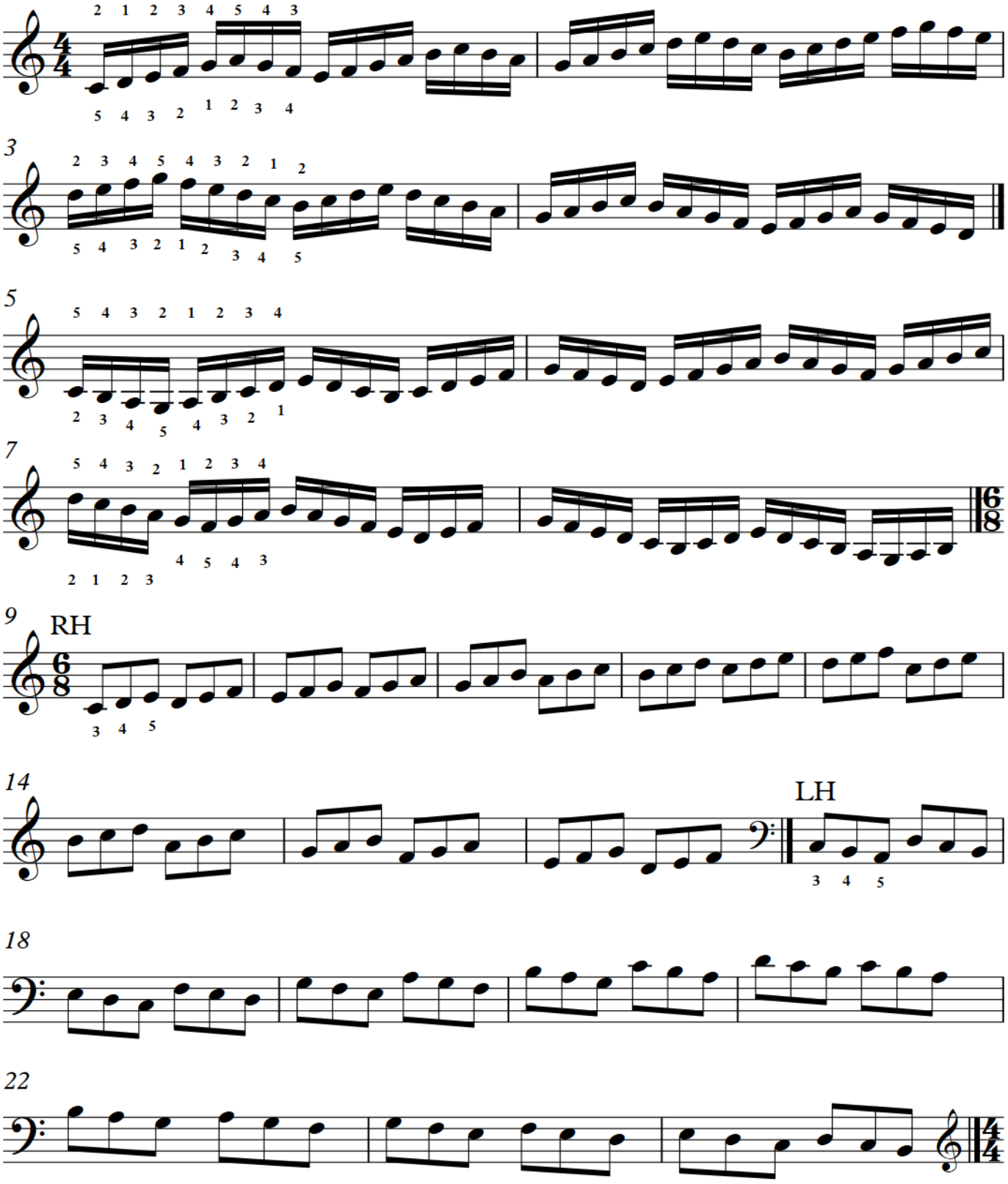
Exercise 2c: Cyclic Finger Action

This exercise is for light, rapid playing. The fingers remain close to the keys, and stroke the key surface towards the player. The arm is fairly light, with the hand partially hanging from the wrist, partially supported by the keys. Beginat 4 x 60 notes per minute, in a legato touch, then gradually increase the speed. The touch will lift off into a non legato at roughly 8 x 76 notes per minute.



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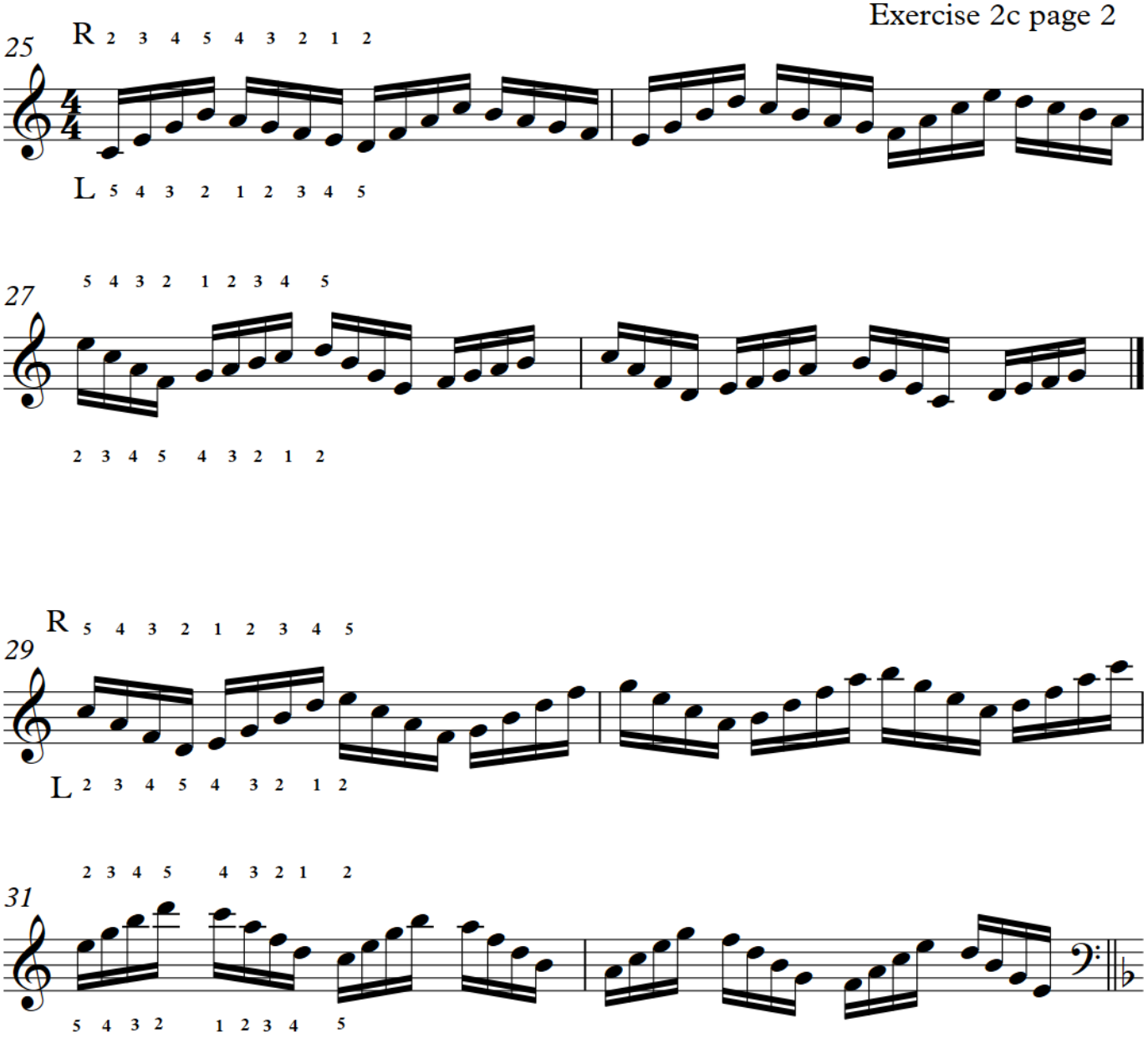
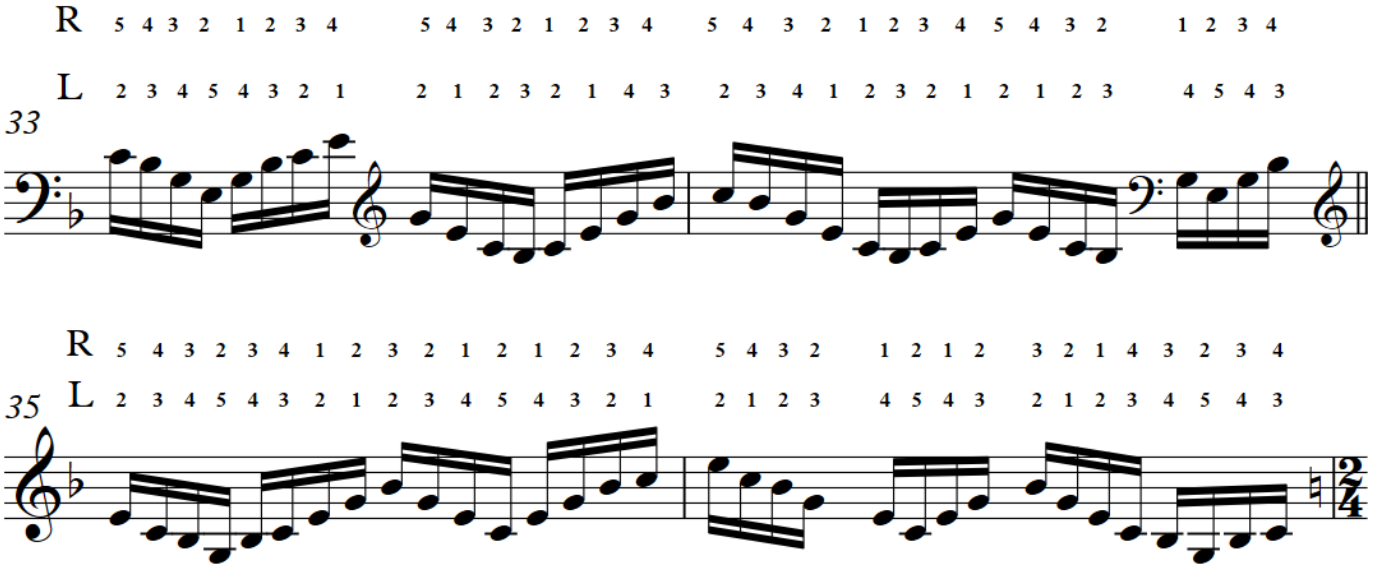


Please note the key-signature of the next exercise. Increase to several octaves.



Exercise 3a: Thumb Exercise

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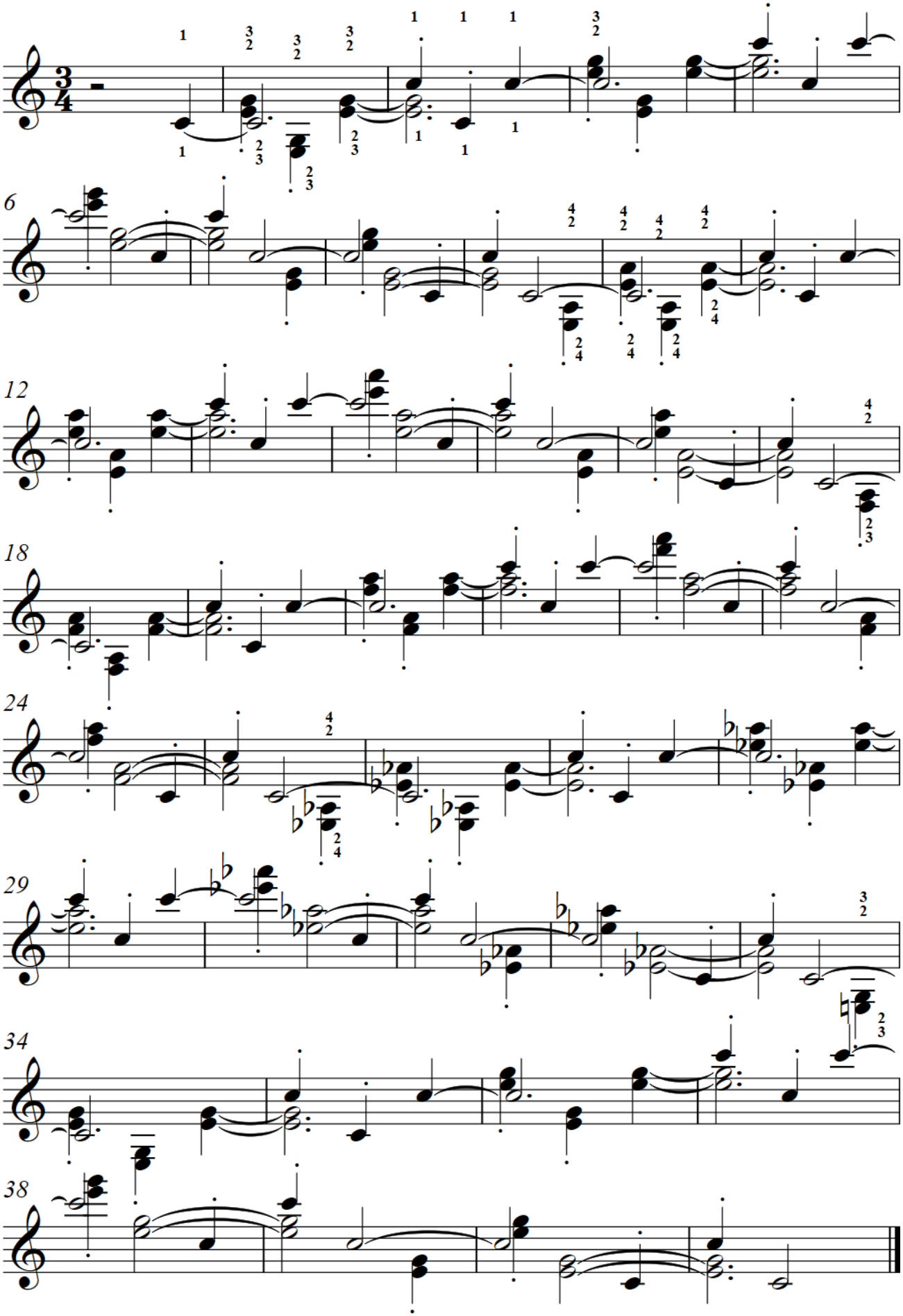

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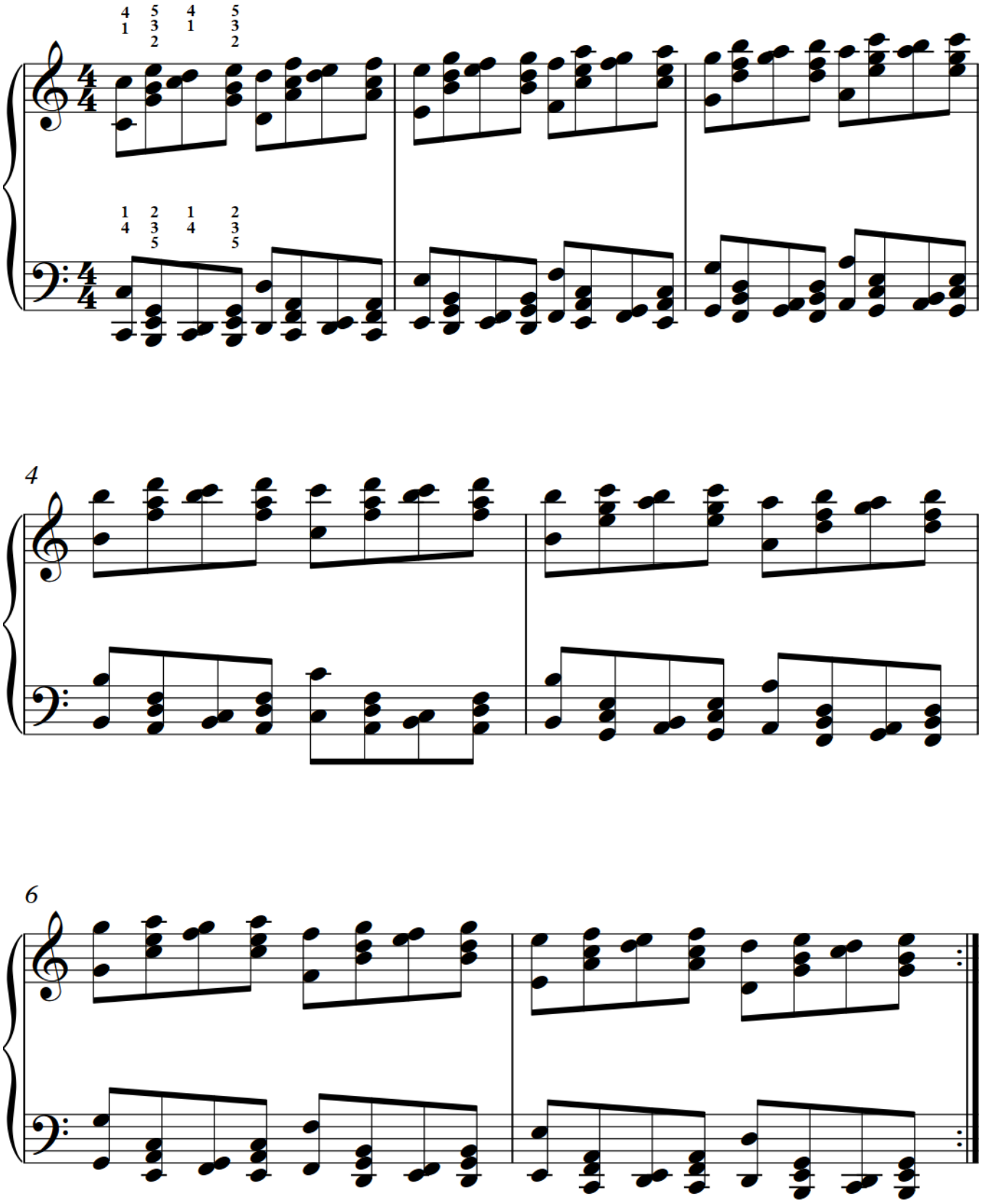
Exercise 3b: Thumb Exercise

Keep the 4th finger well-rounded



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Exercise 3c: Thumb Exercise

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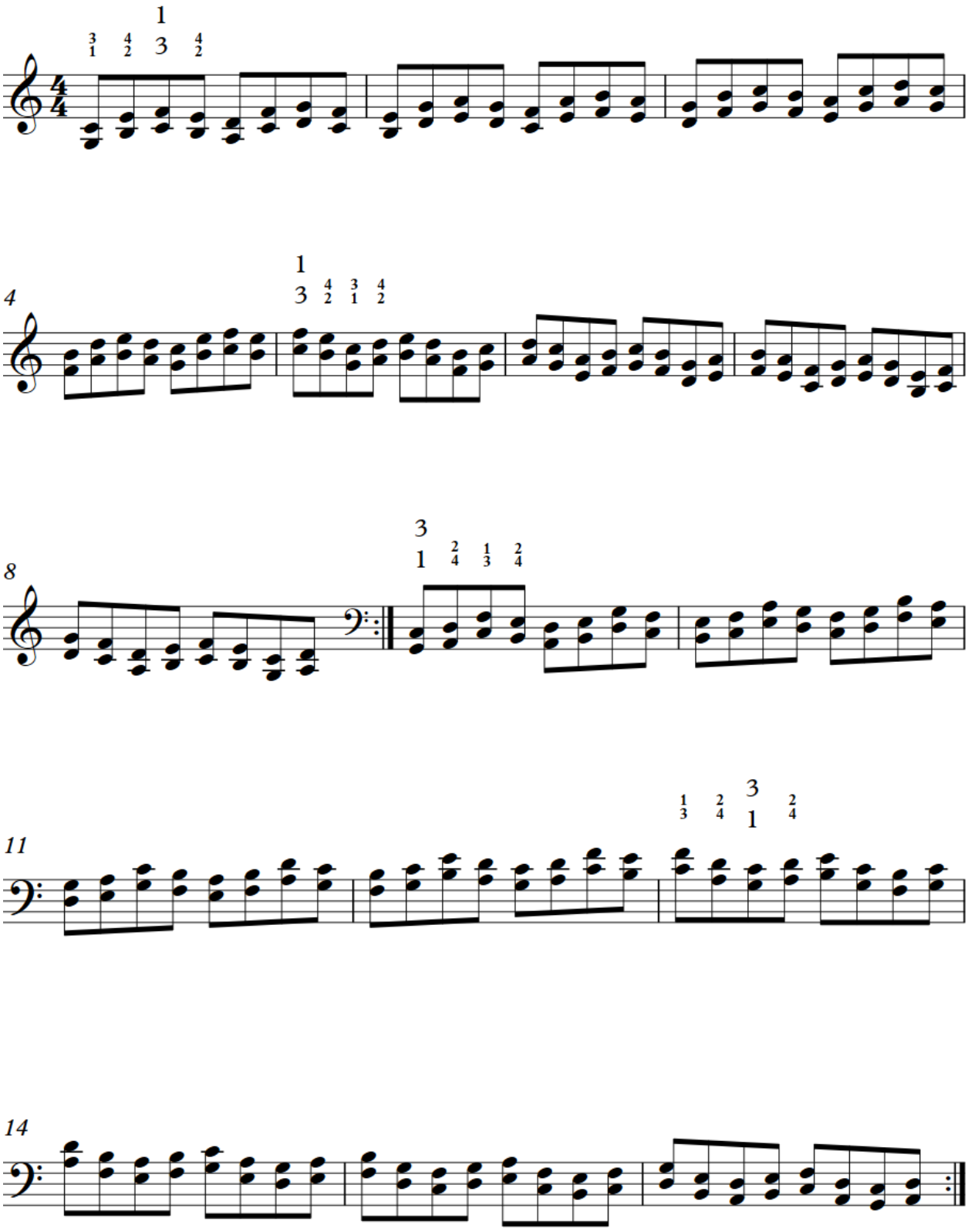

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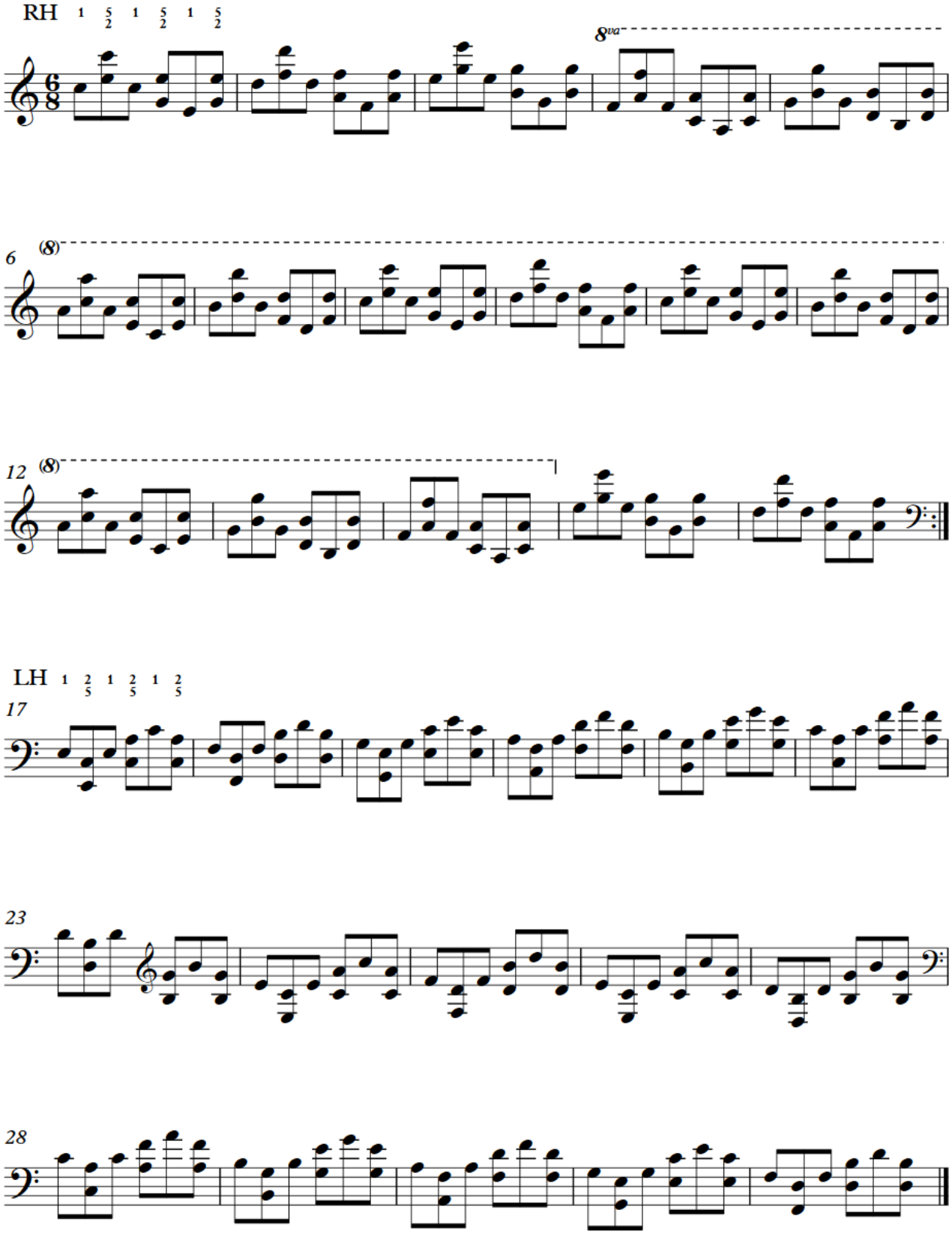
Exercise 3d: Thumb Exercise

Paul White



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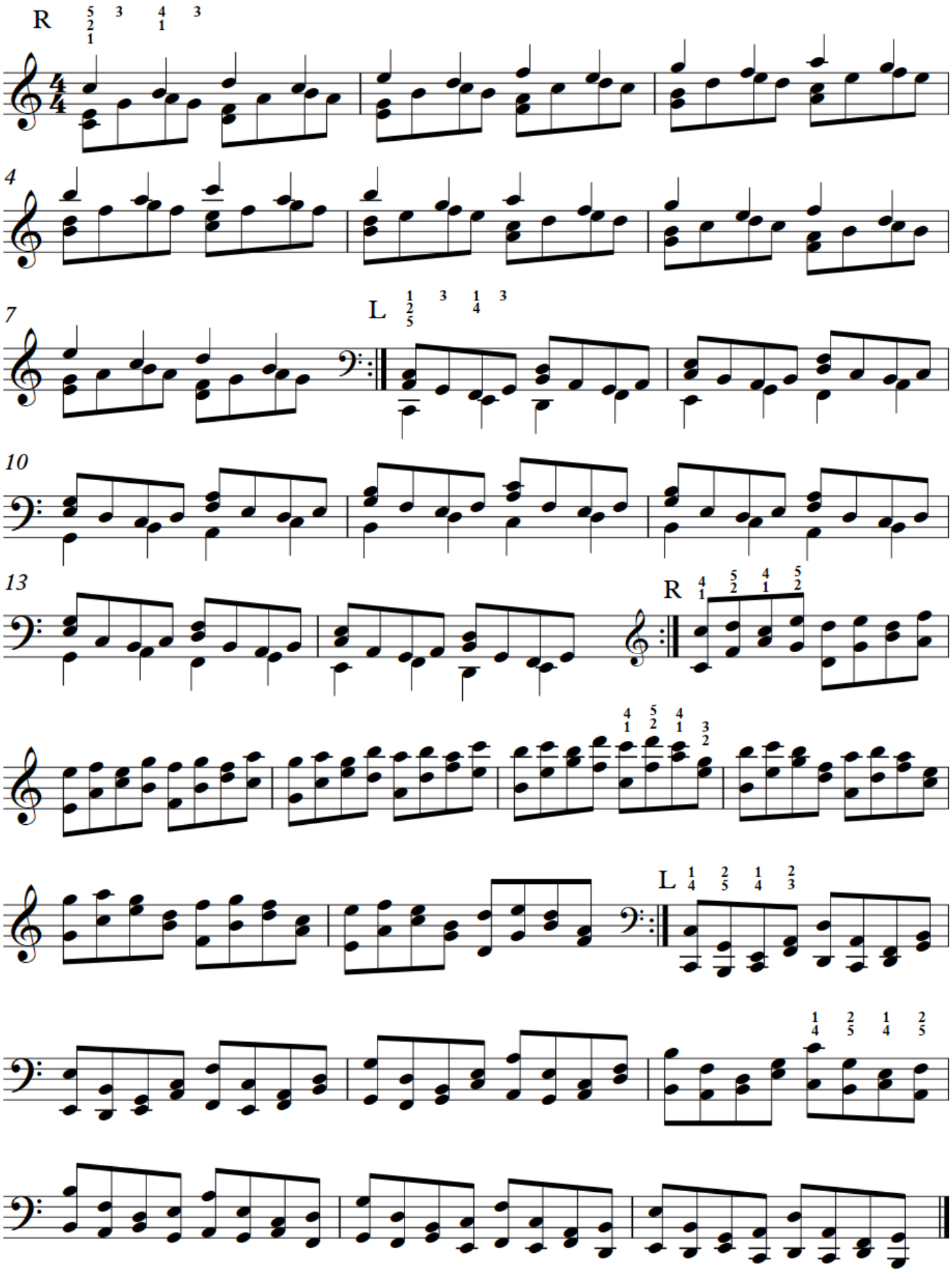
Exercise 3e: Thumb Exercise

Paul White



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Exercise 3f: Thumb Exercise

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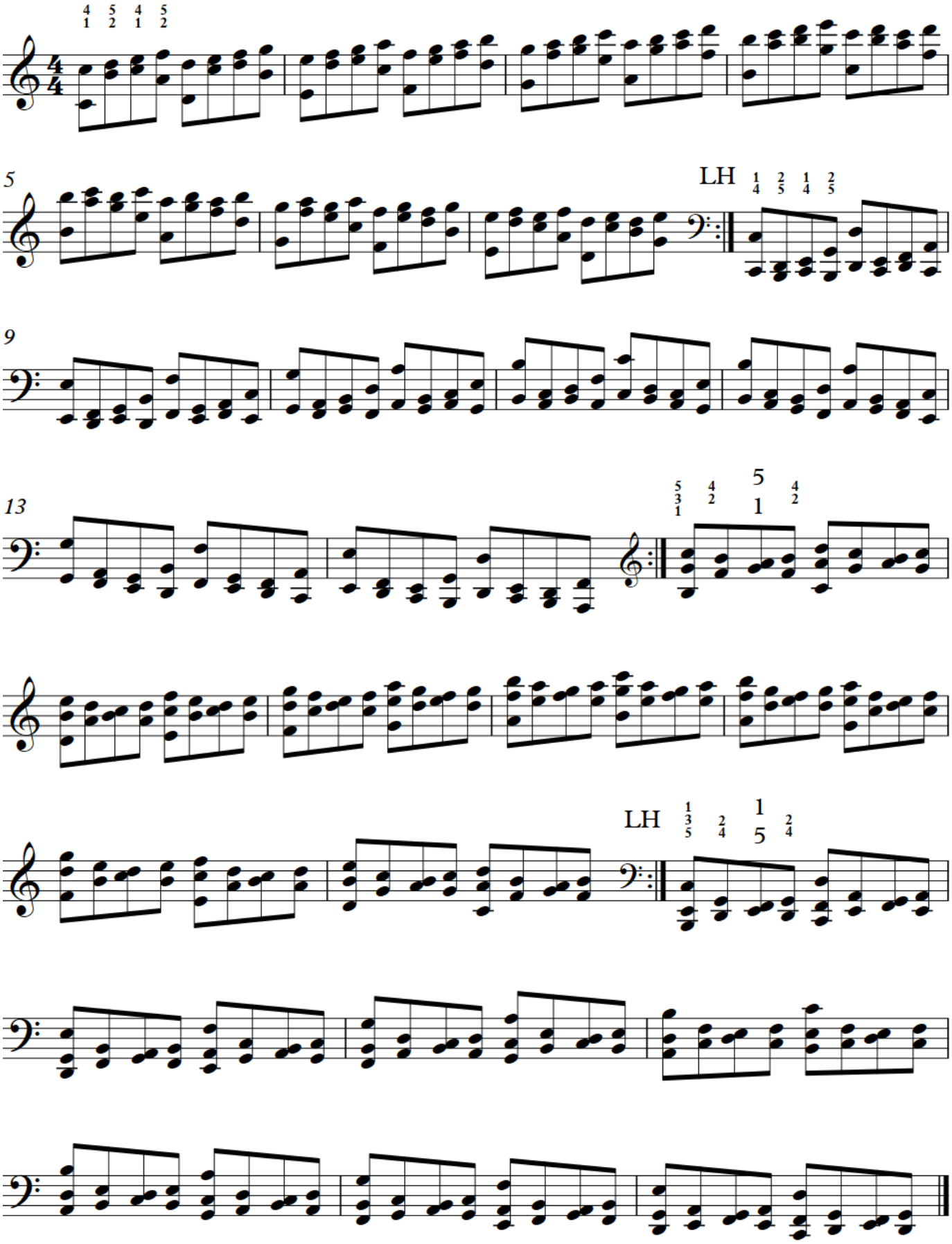

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Exercise 3g: Thumb Exercise

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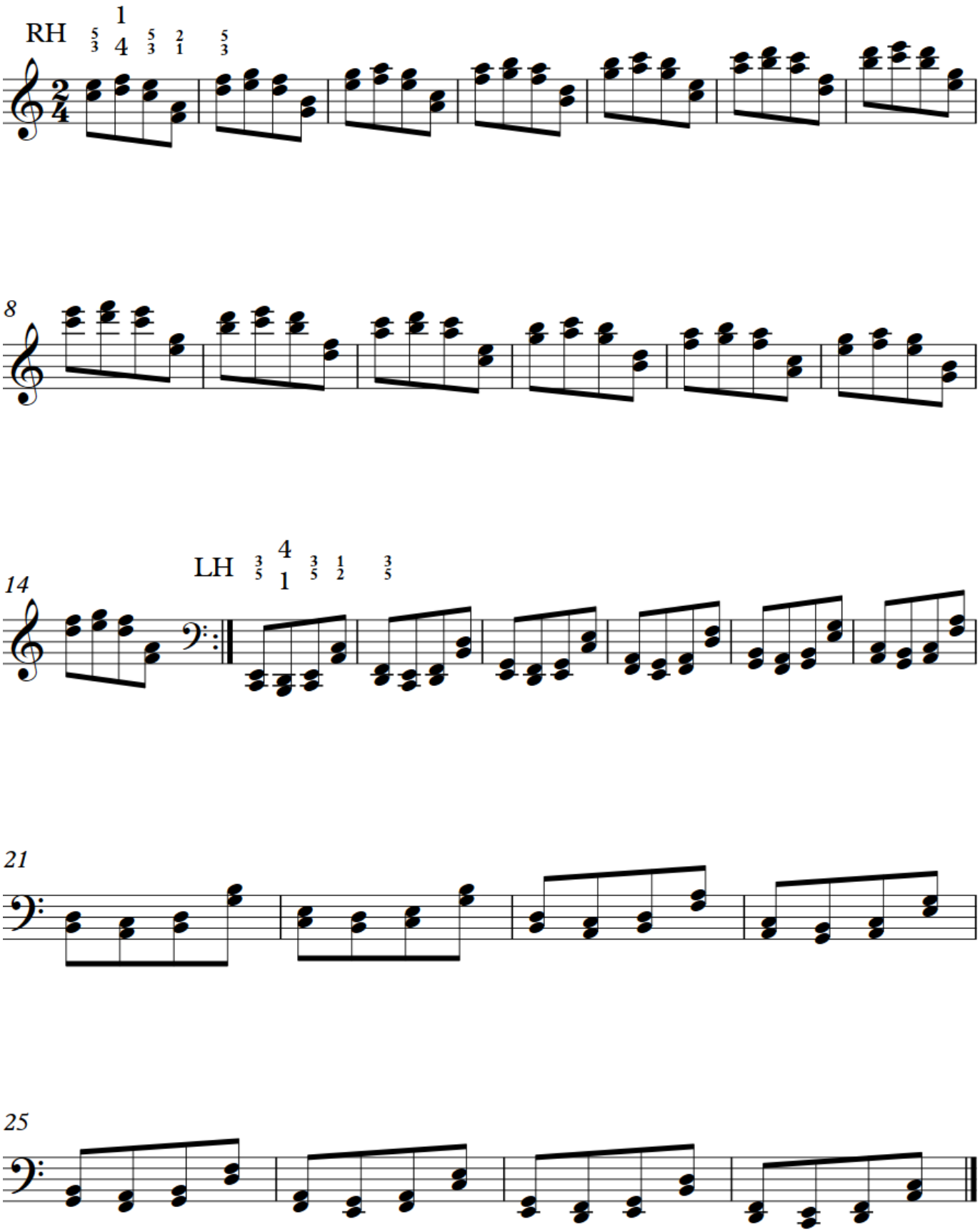

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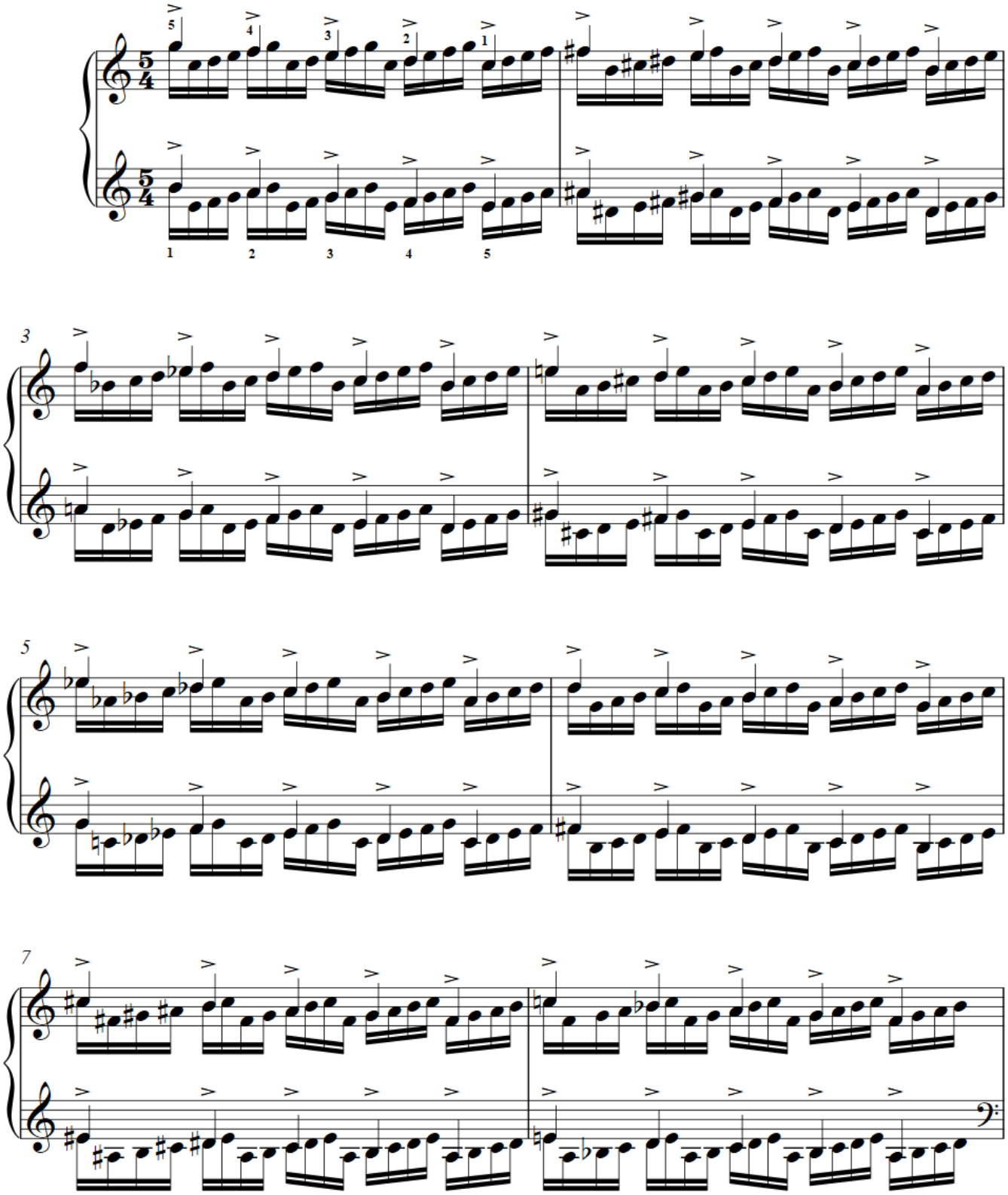
Exercise 4: Emphasising melodic lines

The accented crotchets should be sustained to form a melodic line and played as loud as possible. The remaining semiquavers should be played as quietly as possible. It is also beneficial to reverse this so the crotchets are held lightly and the semiquavers accented by using a stronger finger action and more "resting weight" (see p. 24 of Guide).



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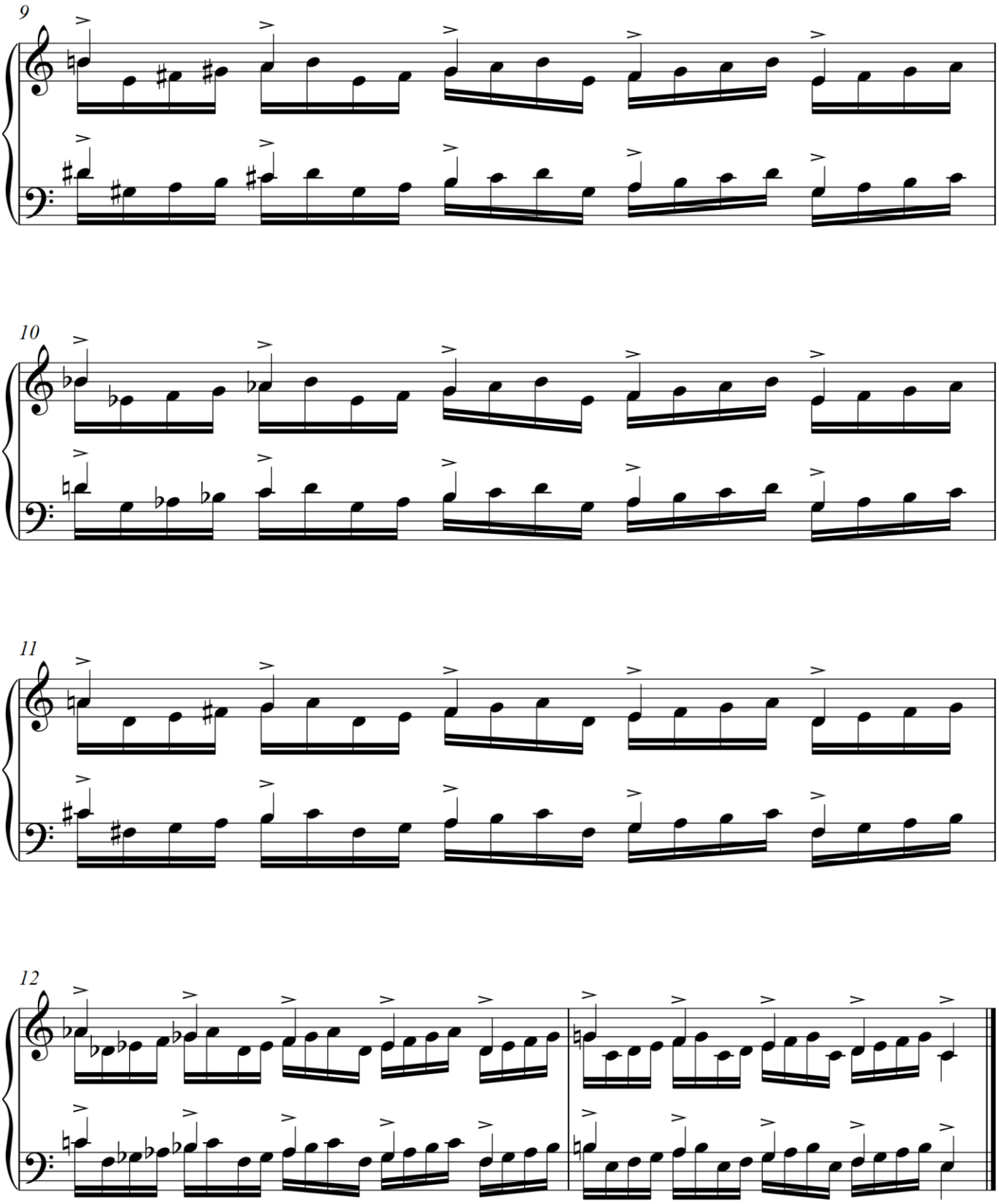
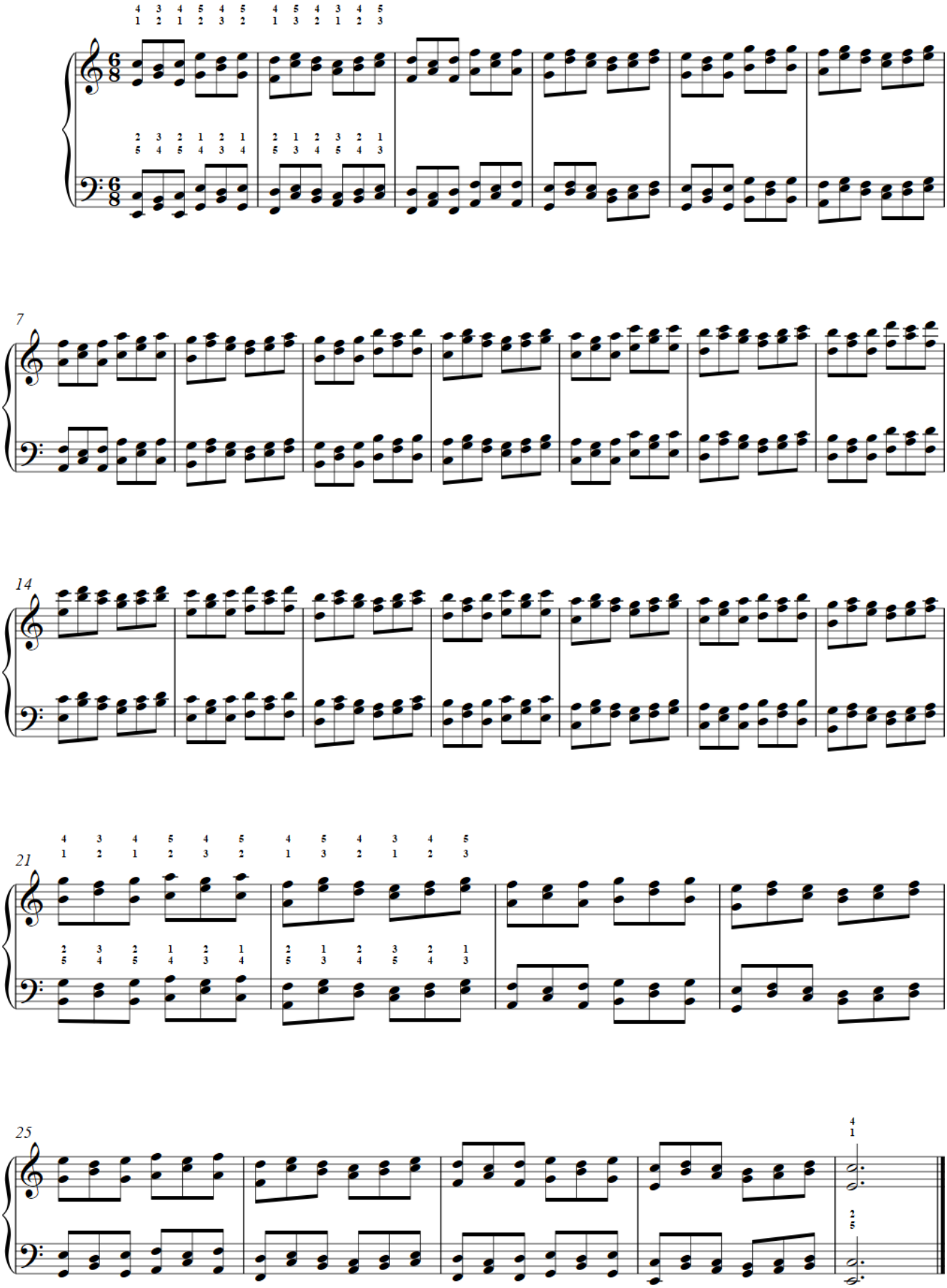

9
10
11
12

Exercise 5a: Double Notes

PAUL WHITE

The fingering indicated should be repeated in subsequent bars. Repeat the exercise in other keys.



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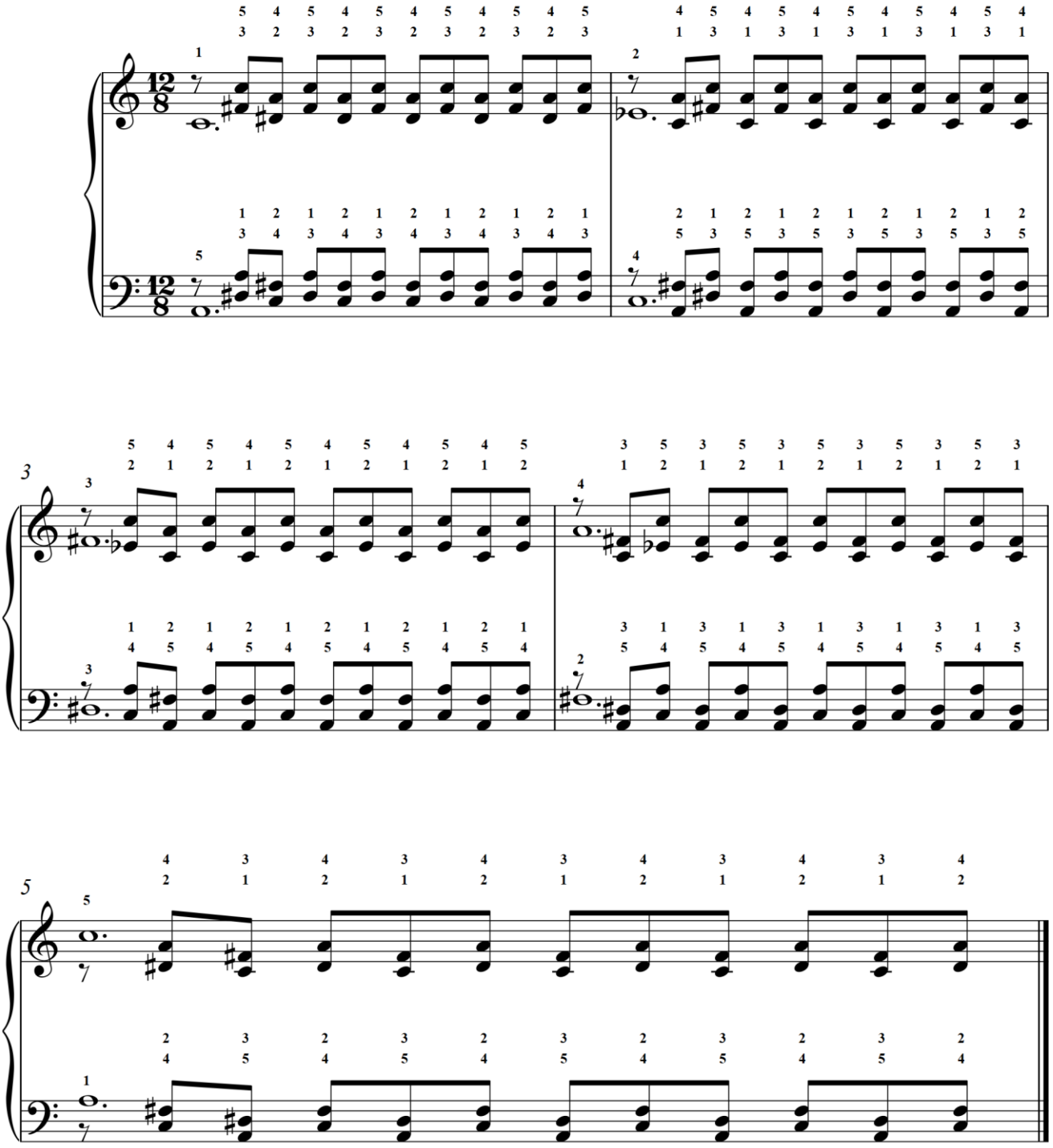
Exercise 5b: Double Notes



The whole exercise should be repeated through all the keys, rising a semitone each time.

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Exercise 5c: Double Notes

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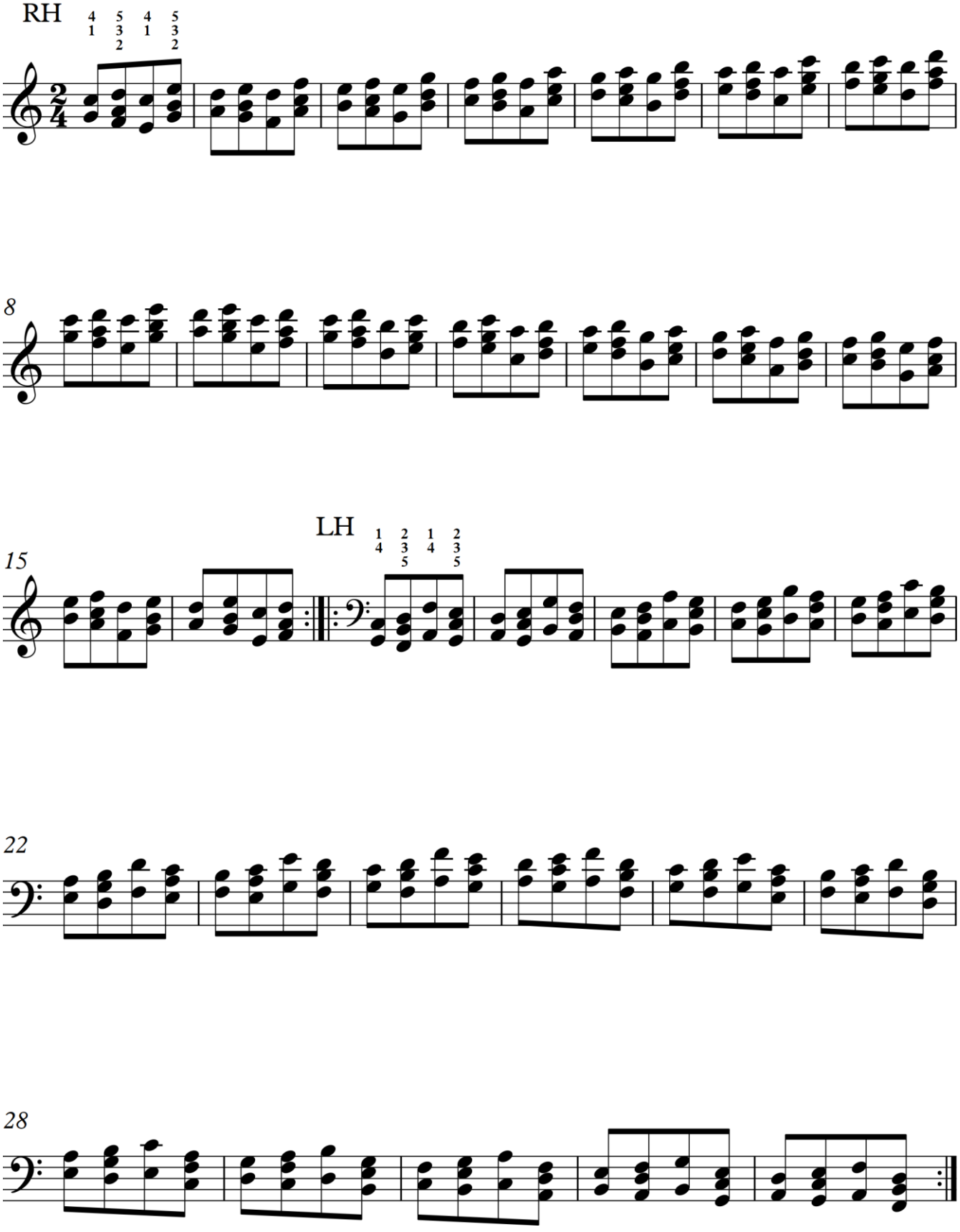
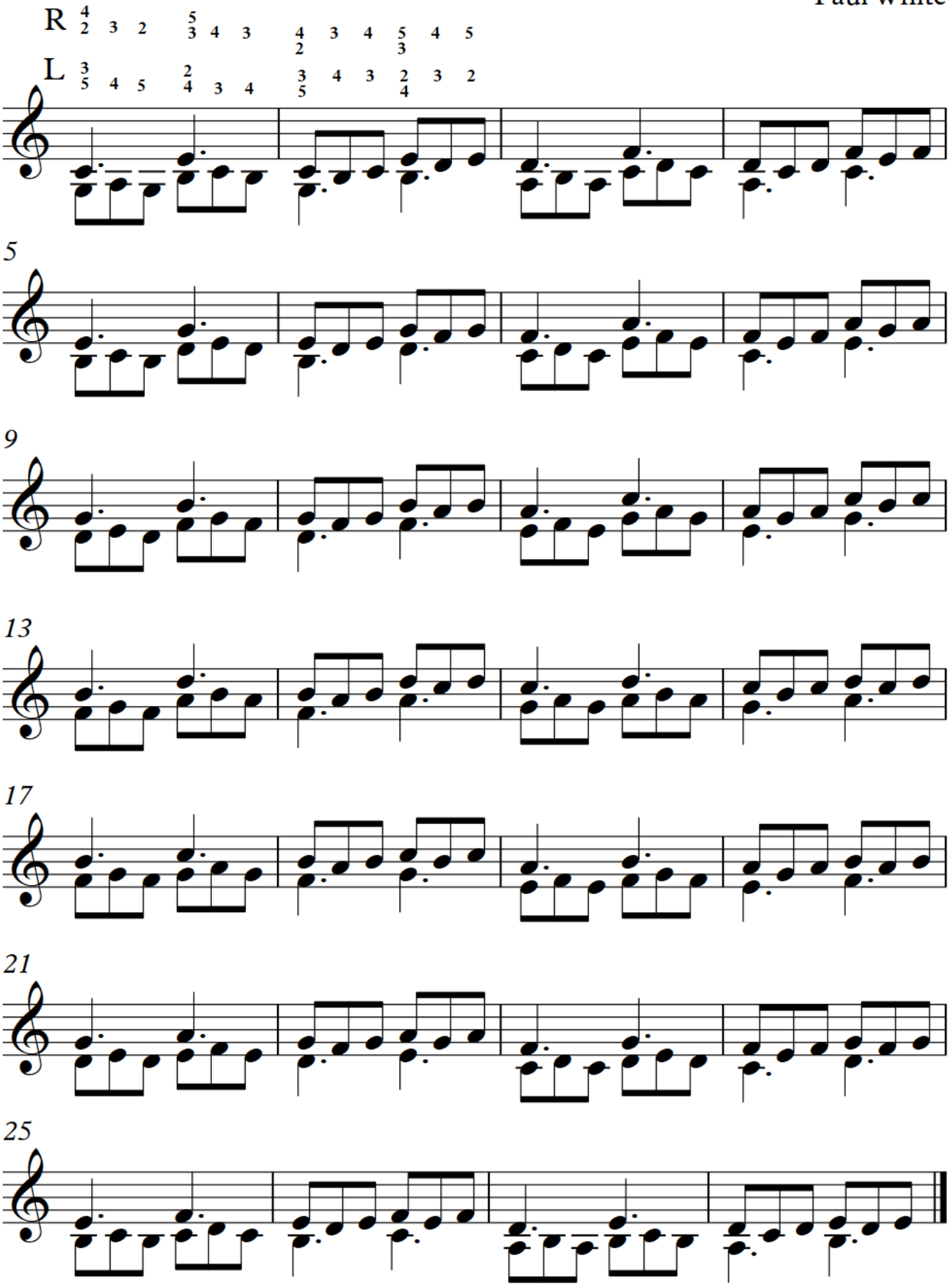
Keep the fourth finger well rounded.



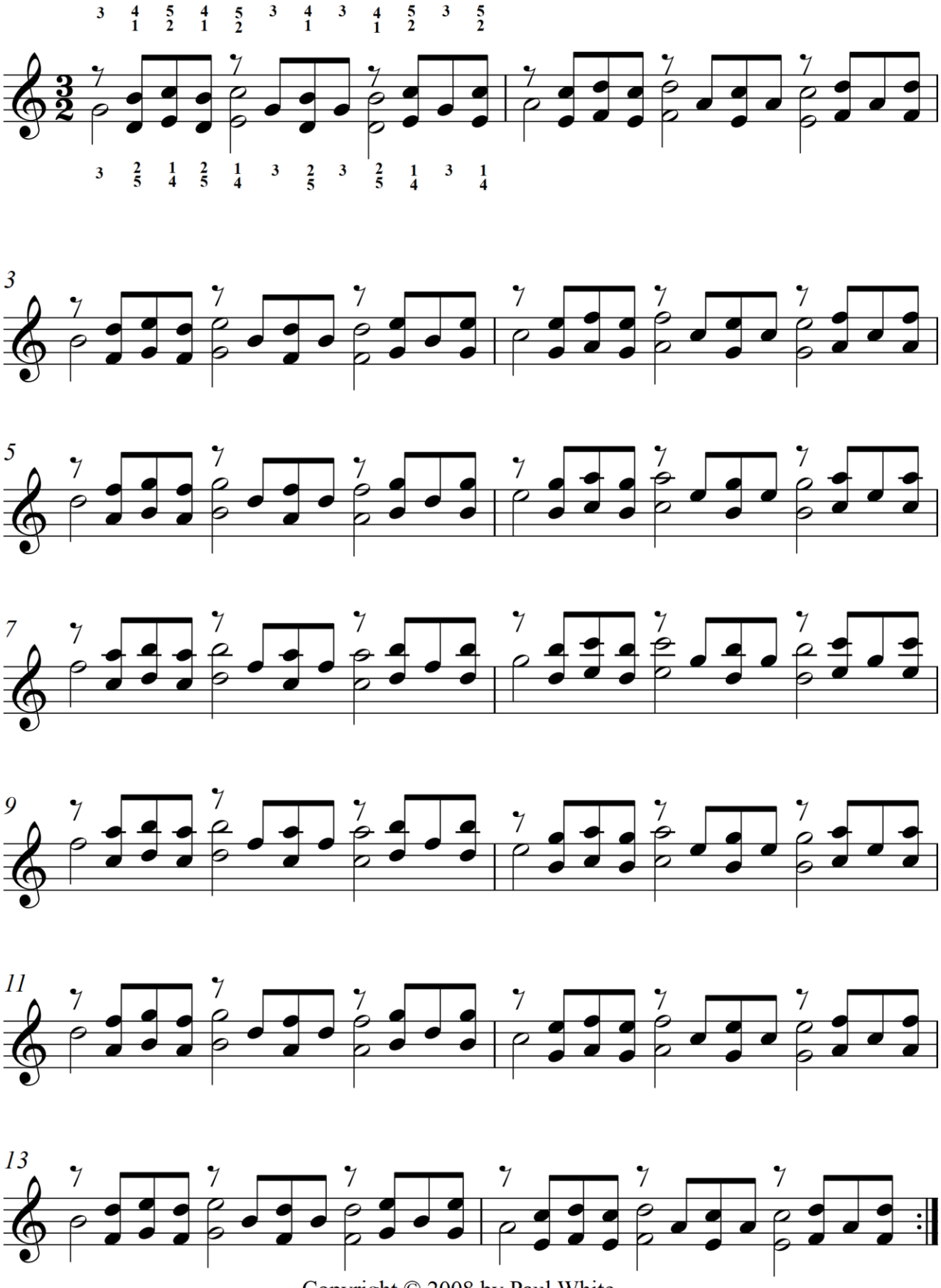
Exercise 5d

Paul White



Exercise 5e: Double Notes

Paul White



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Exercise 5f

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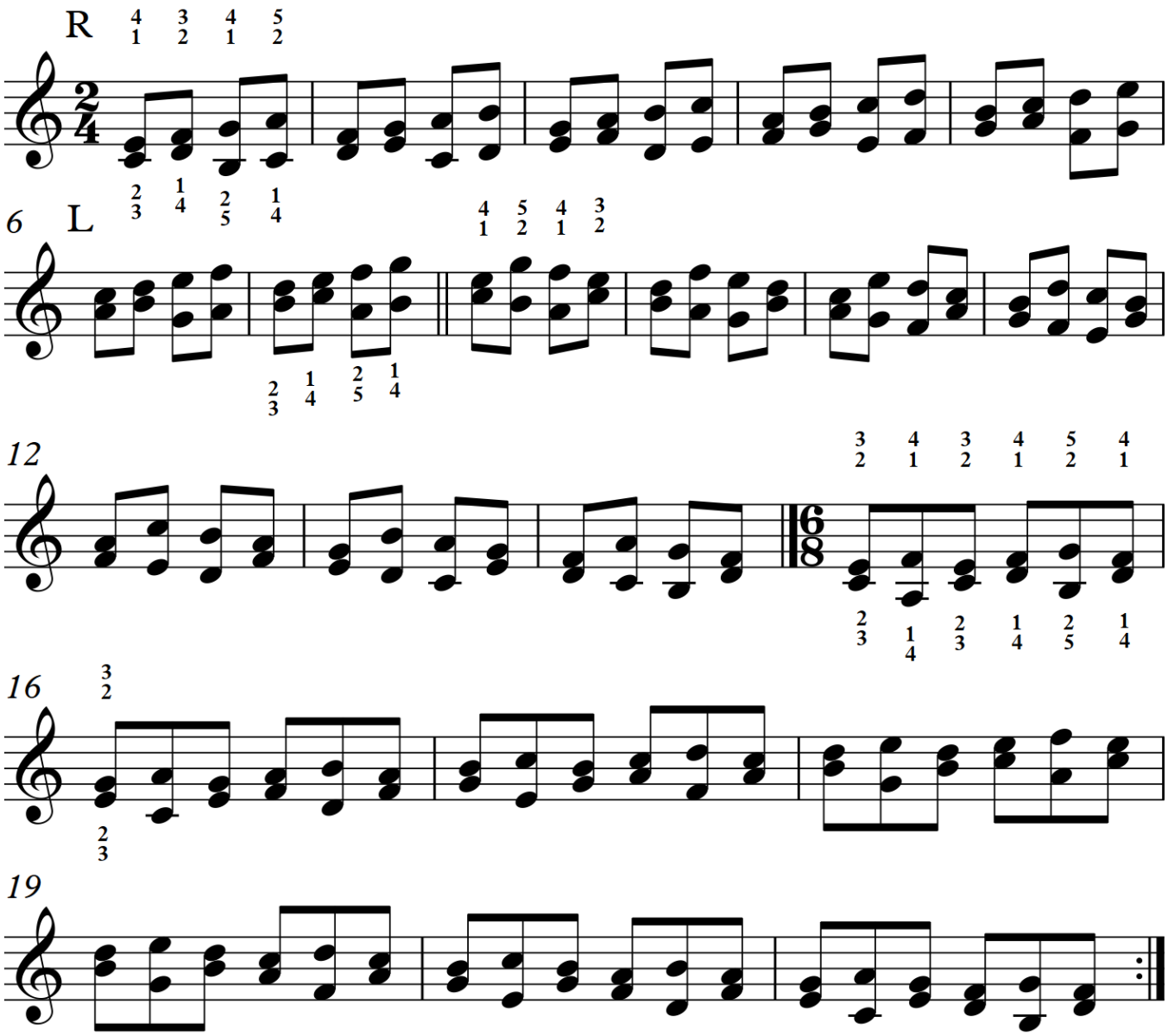

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Exercise 5g double notes with thumb crossing

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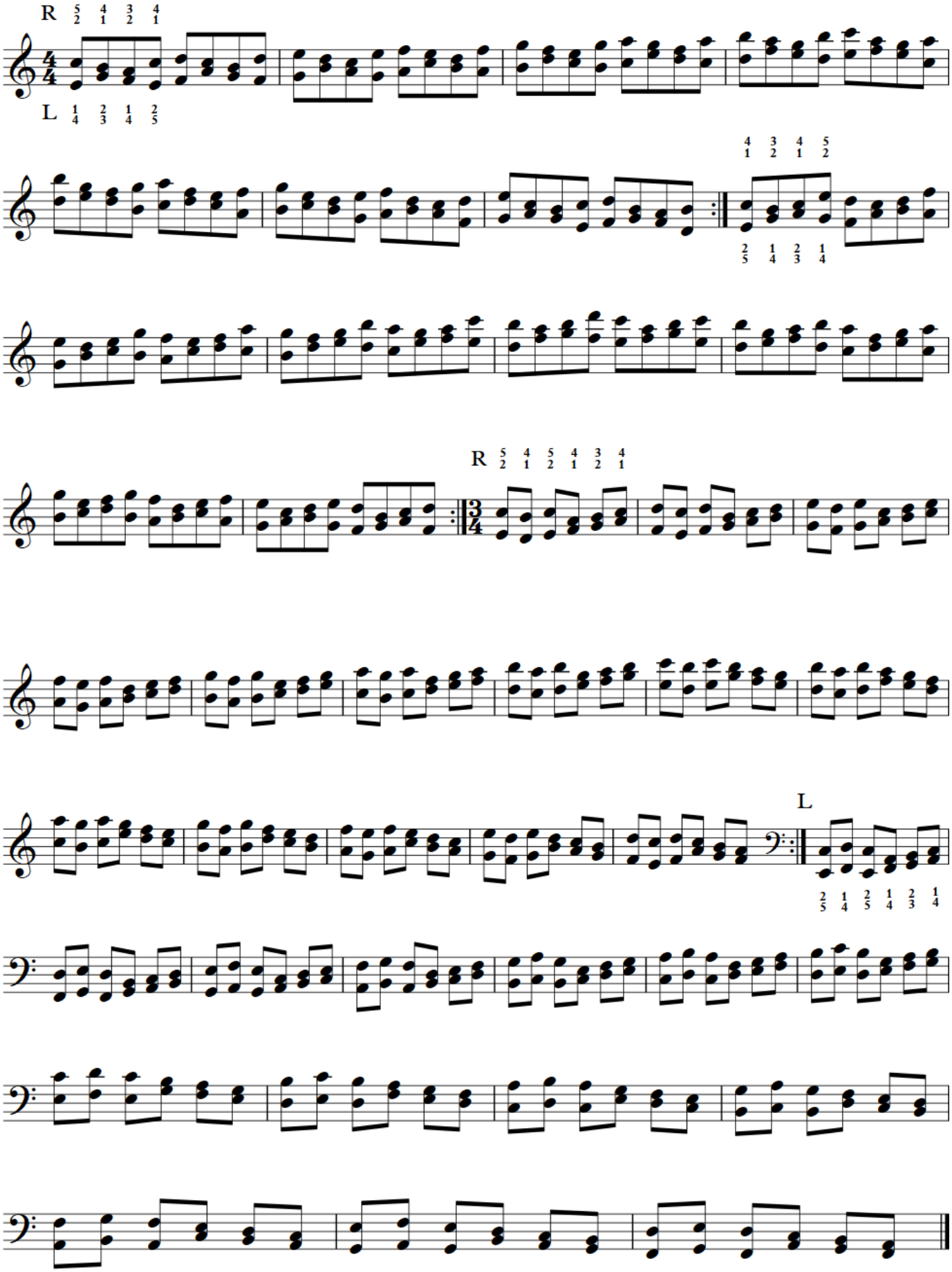

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Exercise 5h: double fourths

First practise the outer fingers (3 4 and 5) alone.

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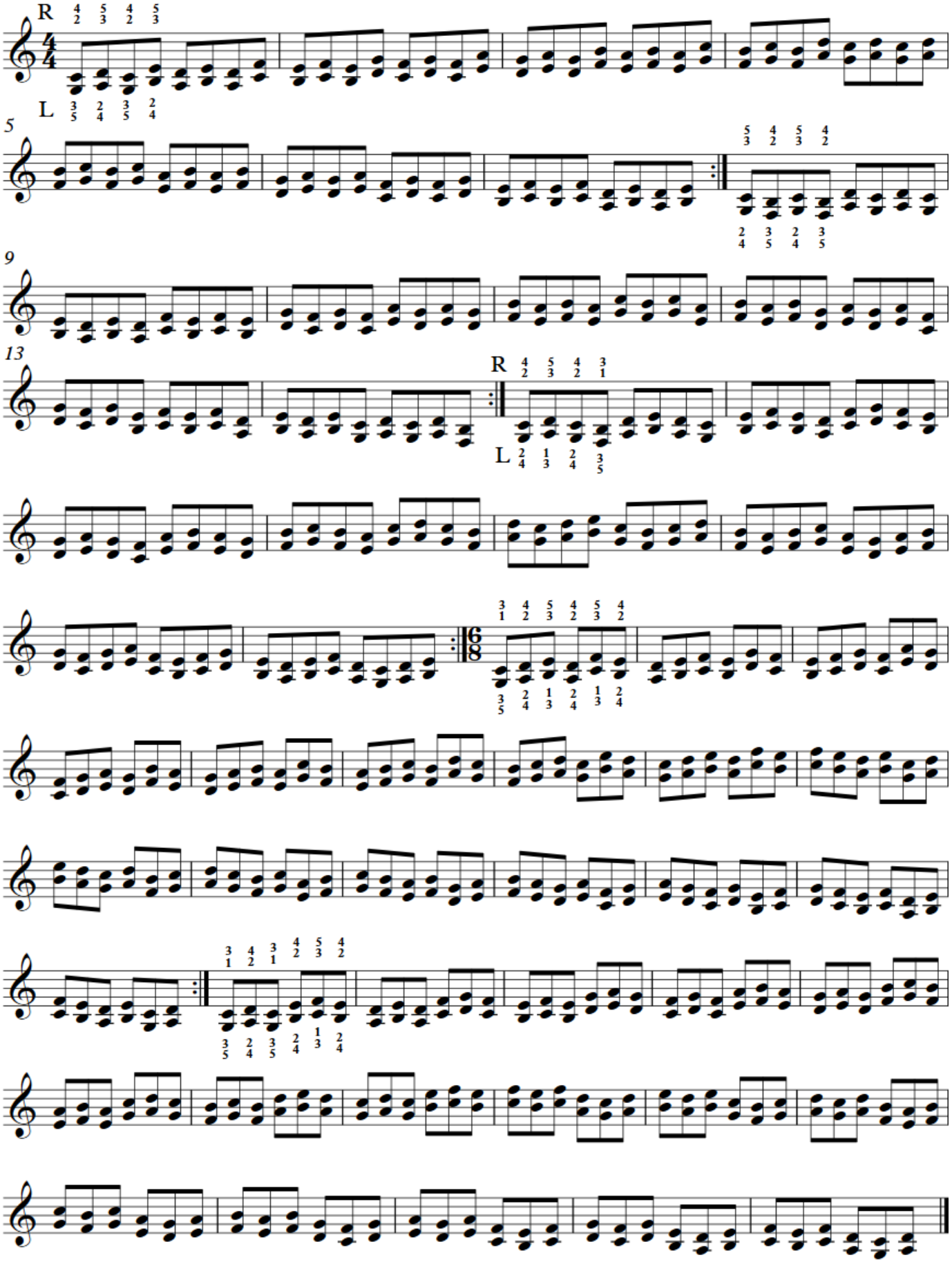

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Exercise 5i: double notes

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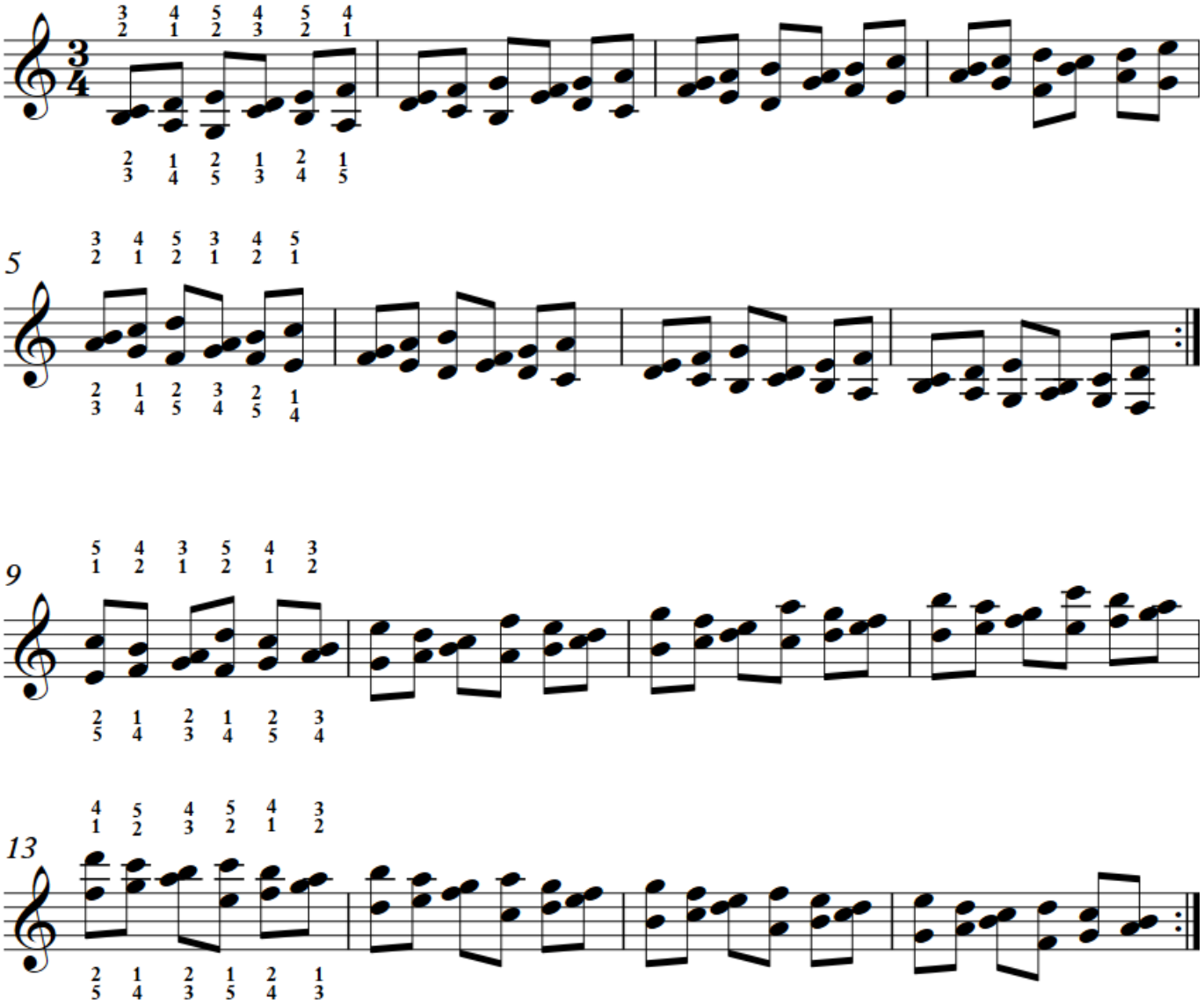

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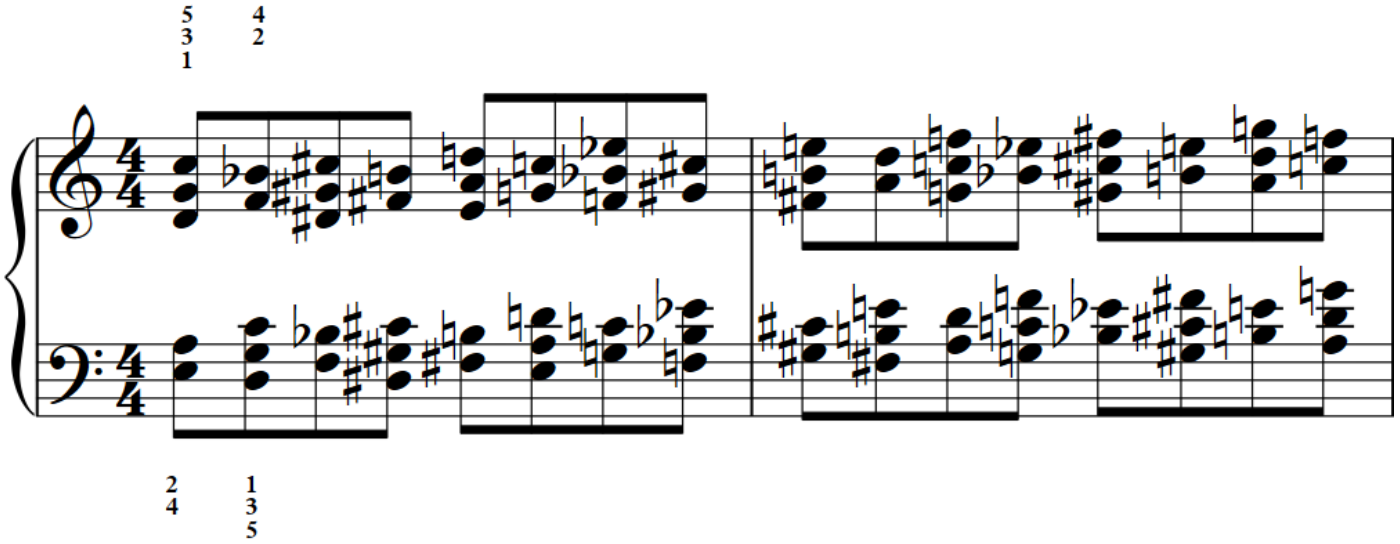
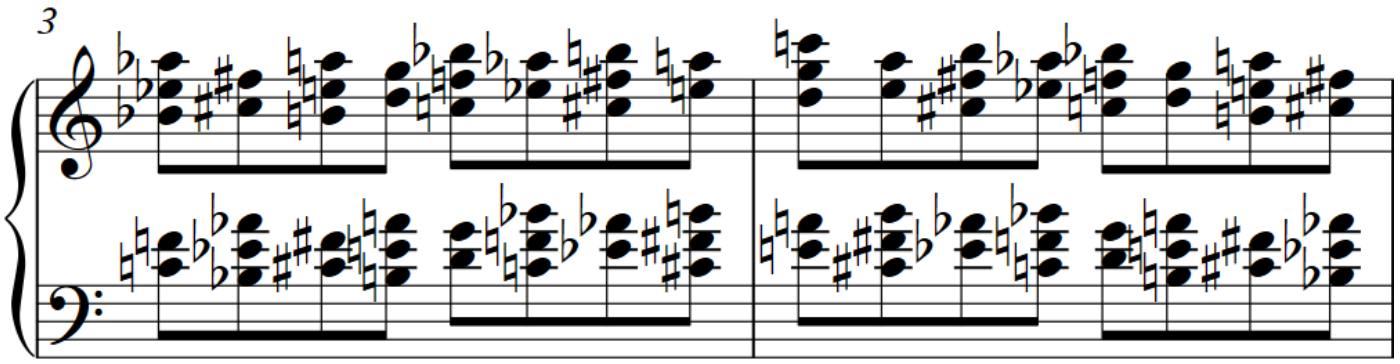
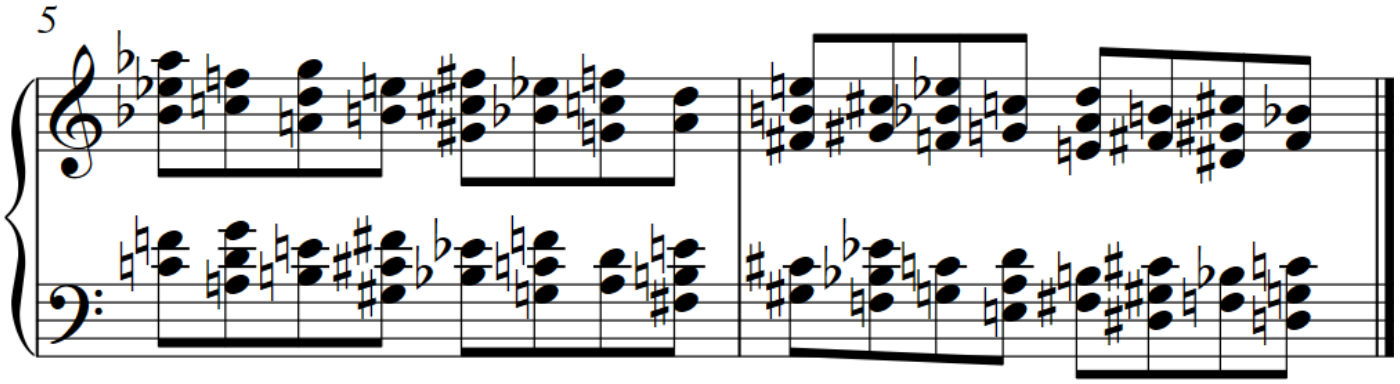
Exercise 5j: Double Notes

Paul White







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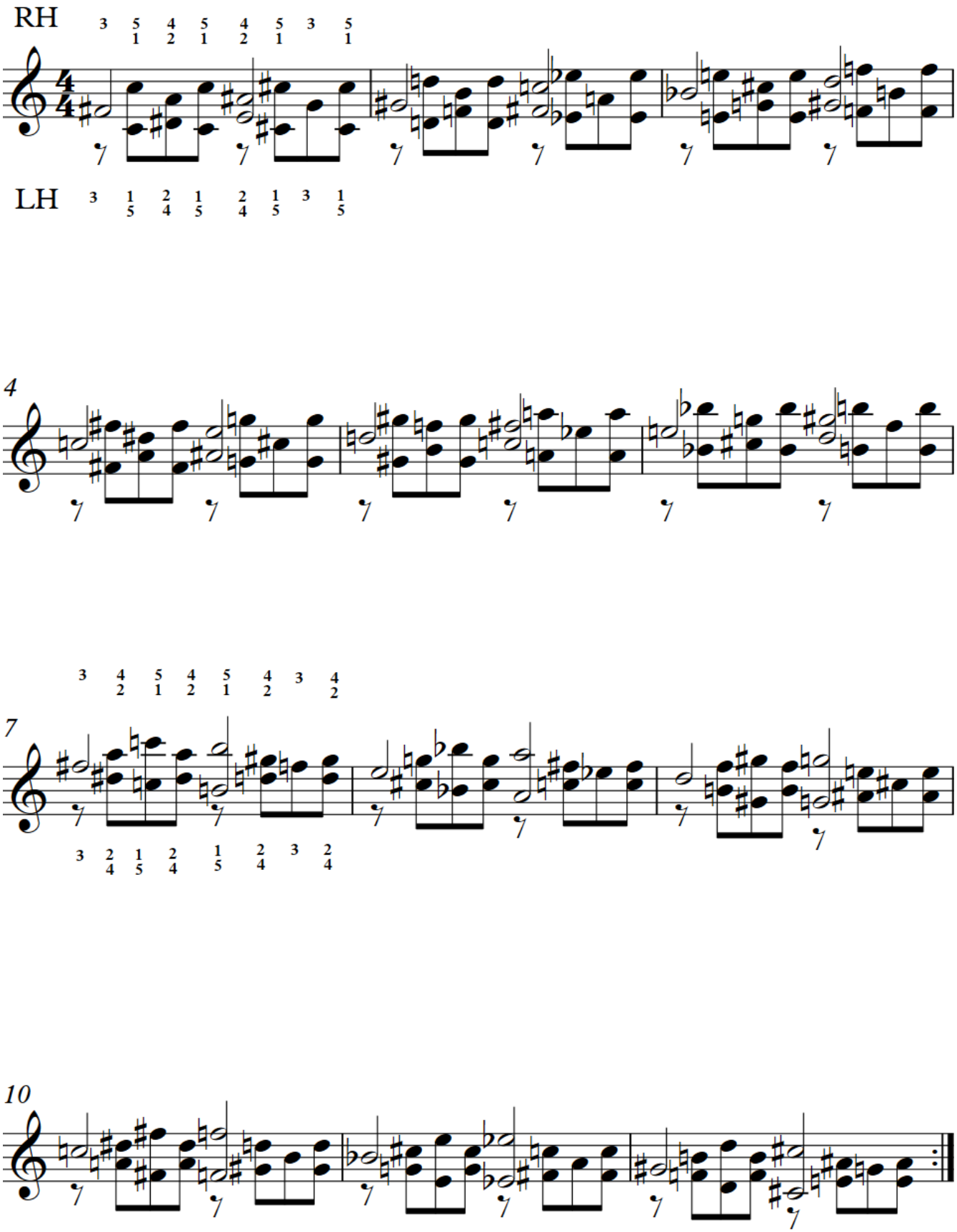
Exercise 5k: Double Notes

Paul White



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Exercise 5 1 : double notes

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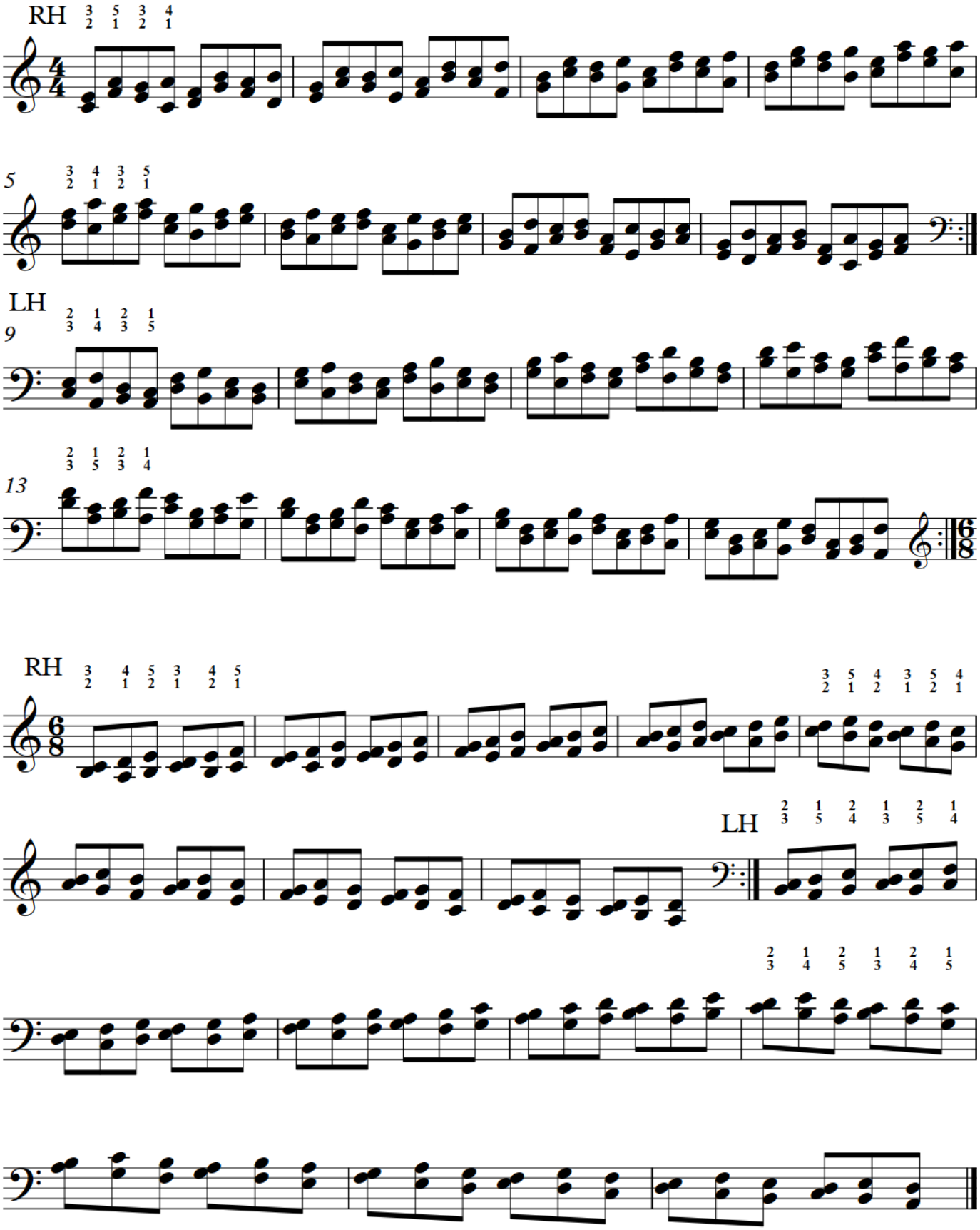

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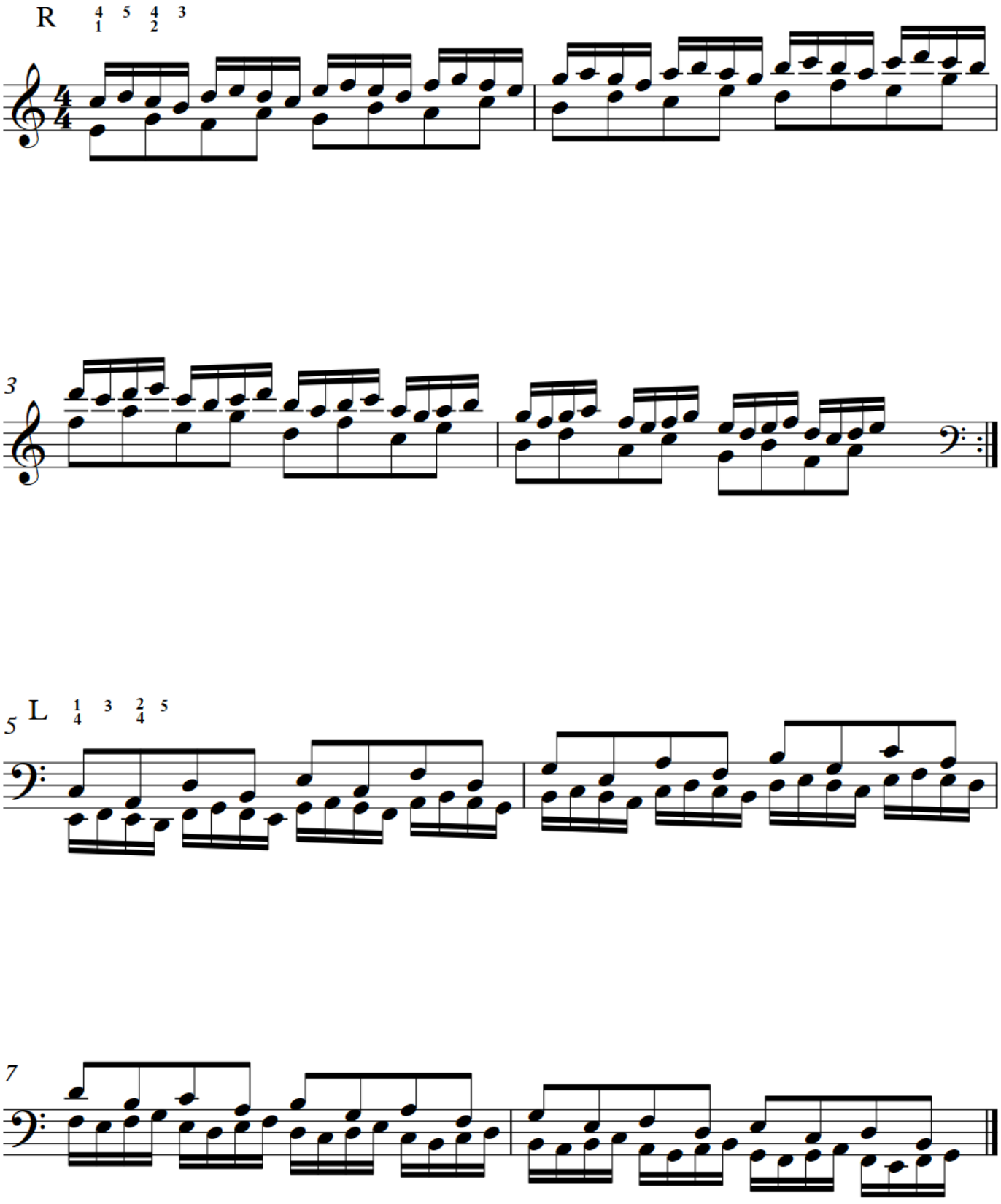
Exercise 5m: Double Notes

Paul White



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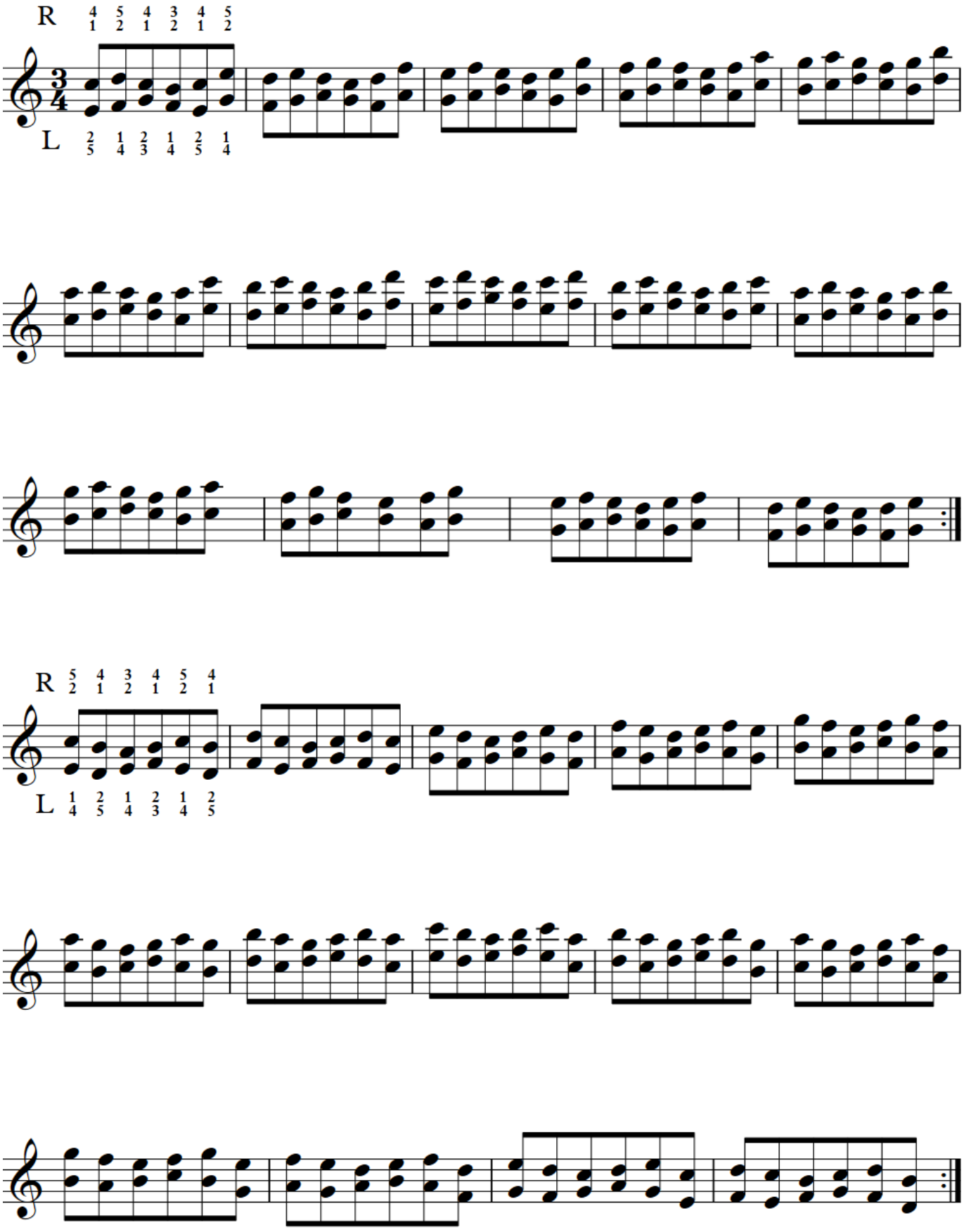
Exercise 5n: Double Notes

Paul White



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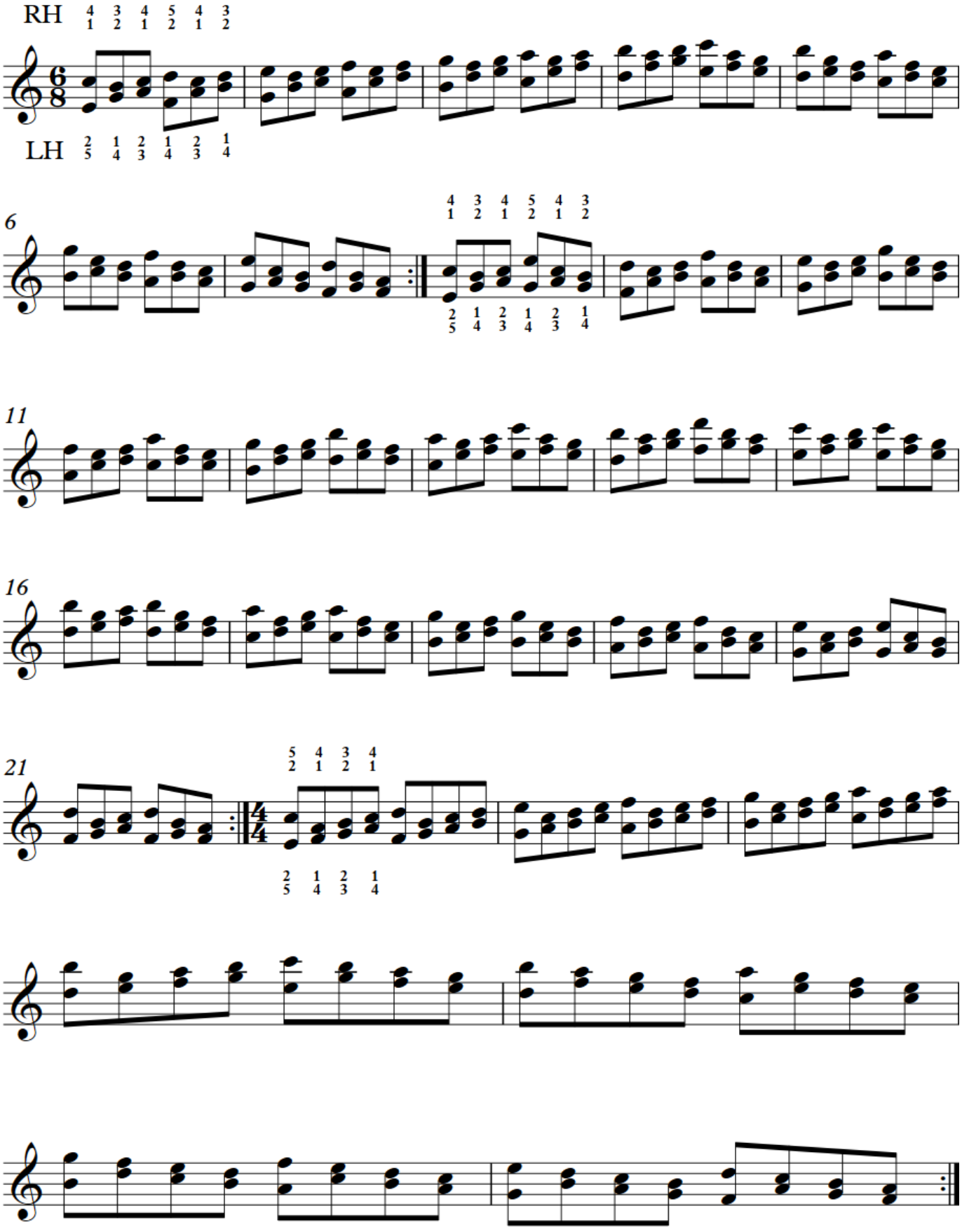
Exercise 5o: Double Notes

Paul White



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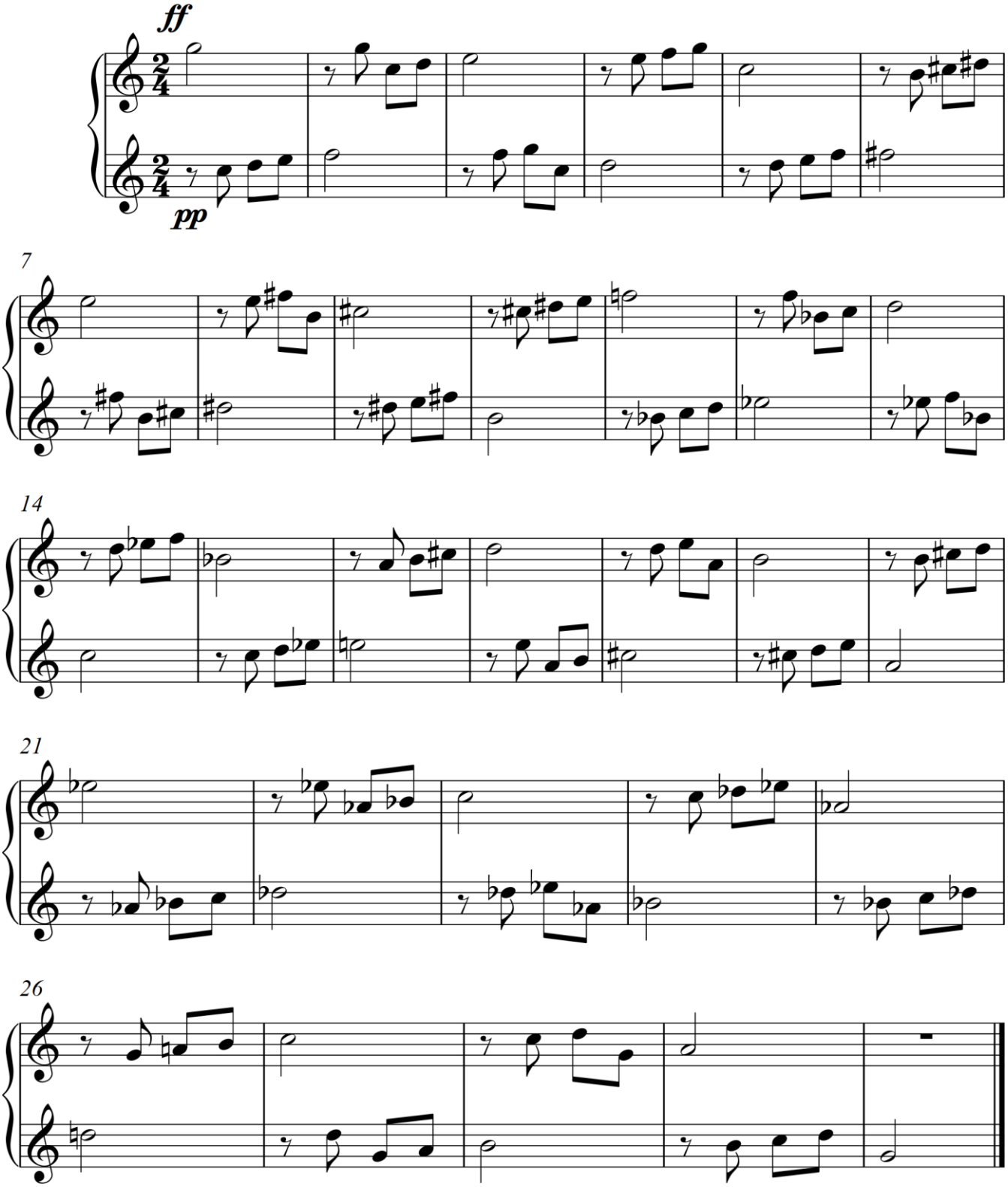
Exercise 6: Counterpoint

Both parts should be played by the right hand, then the whole exercise repeated with the left hand. The soprano part should be played fortissino and the alto part pianissimo throughout.



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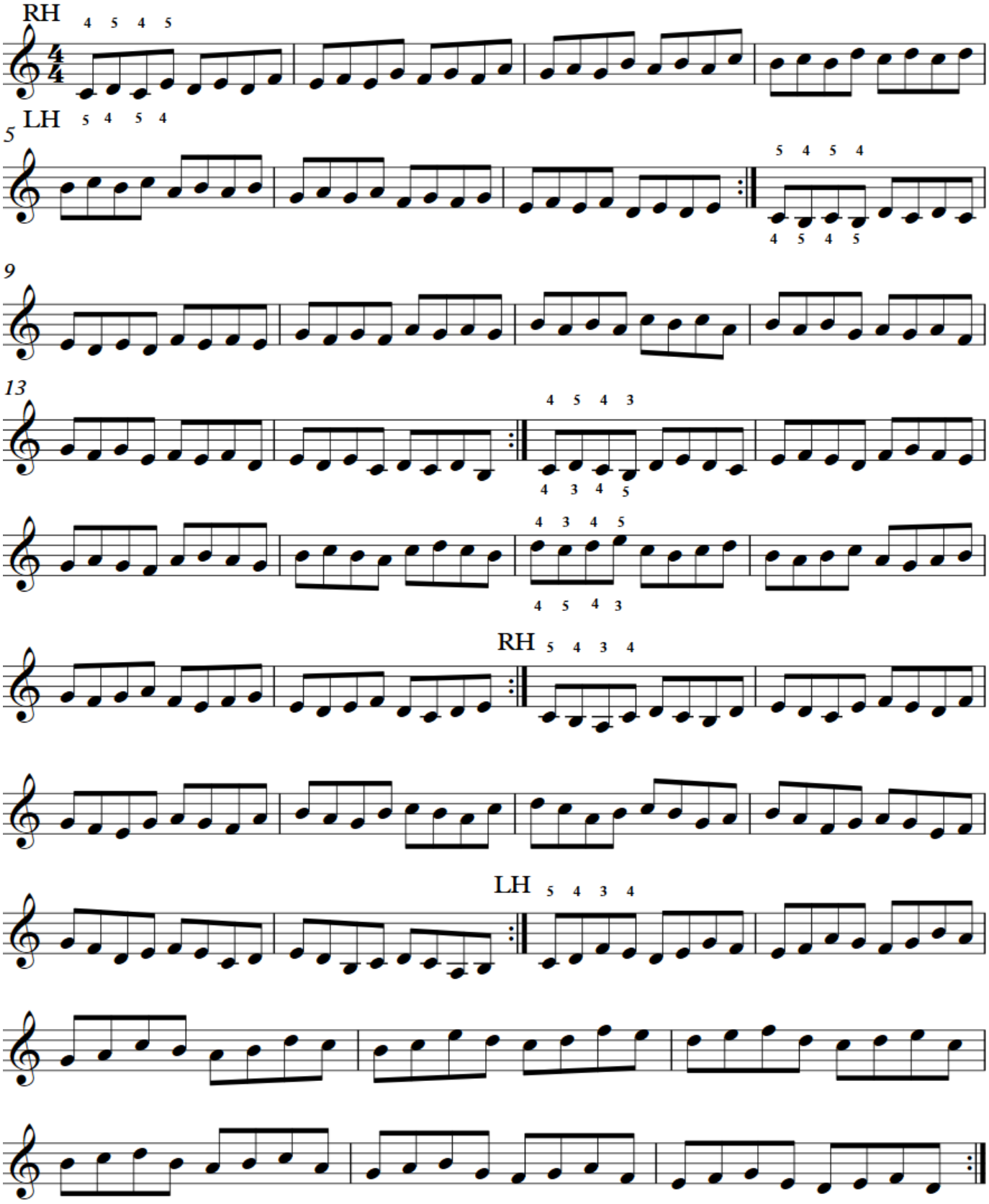
Exercise 7a: Outer Fingers

Paul White

This exercise strengthens the 4th and 5th fingers. The thumb is never used. It should be approached carefully at first, as the outer fingers are susceptible to injury. Practise each section separately, alternating hands. Gradually speed up the exercise, finally repeating each section rapidly several times without a break. The first two sections can also be played with the 3rd and 4th fingers.



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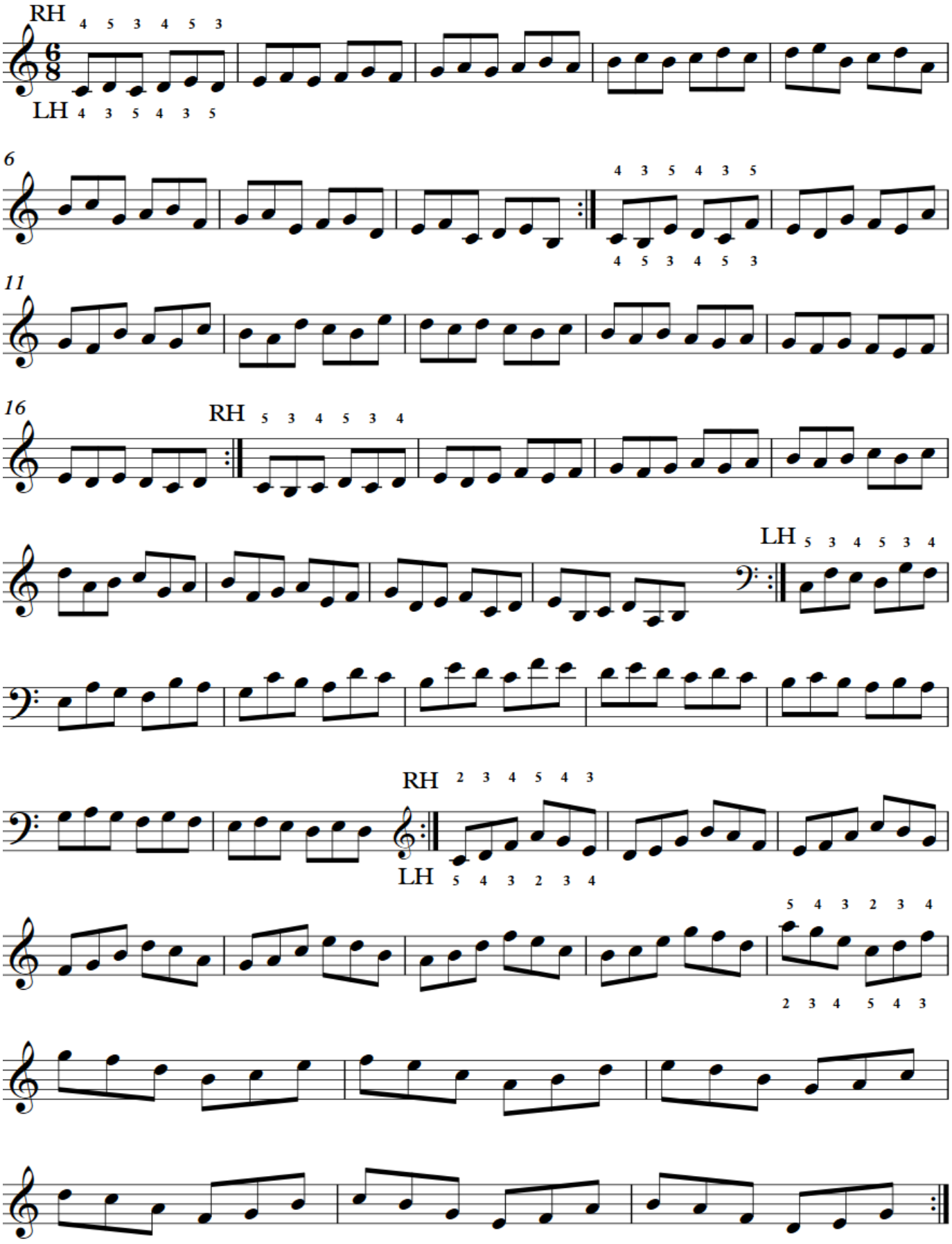
Exercise 7a page 2

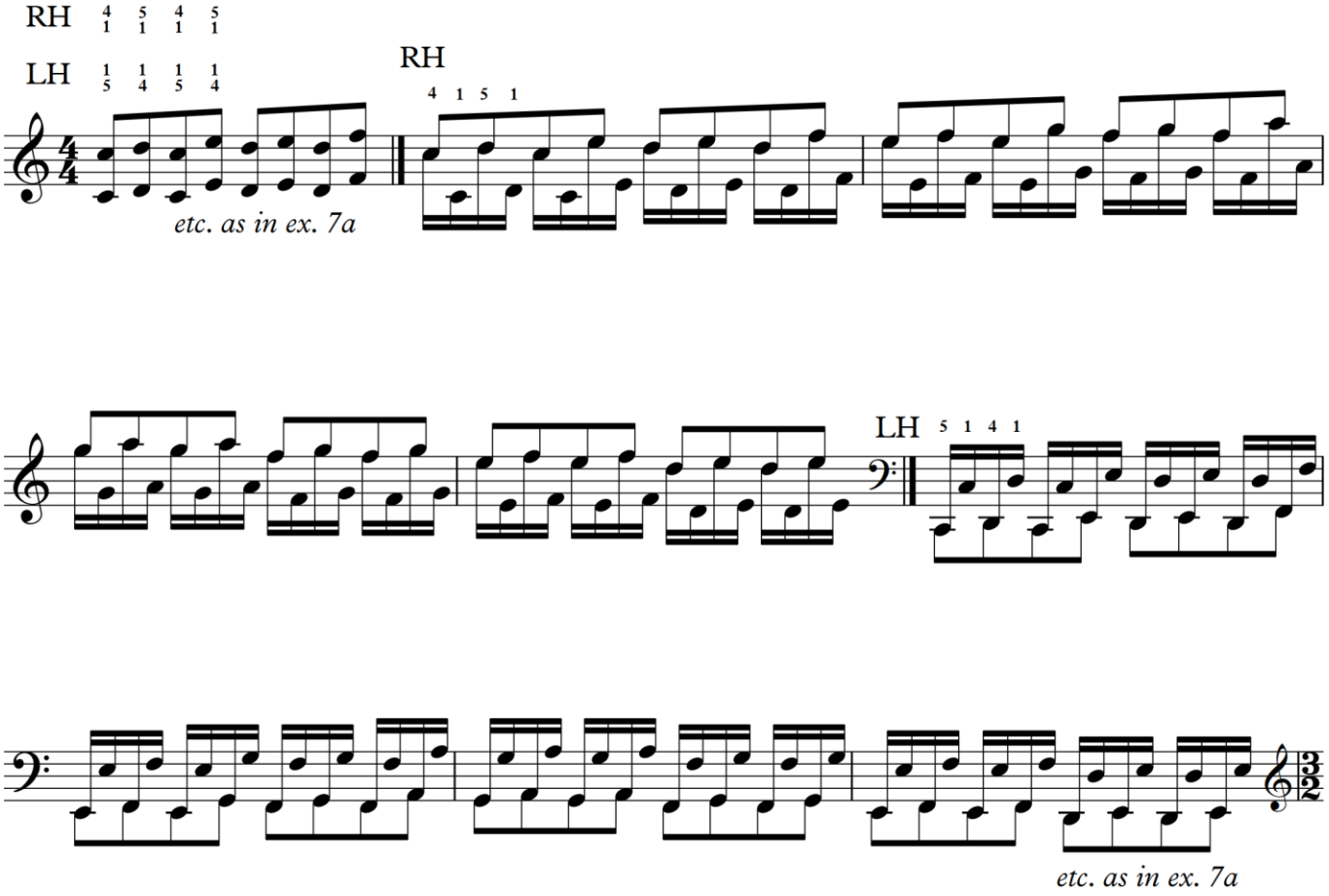
Practise slowly then gradually speed up the exercise. Finally, repeat each section rapidly several times with out a break with one hand, then the other.



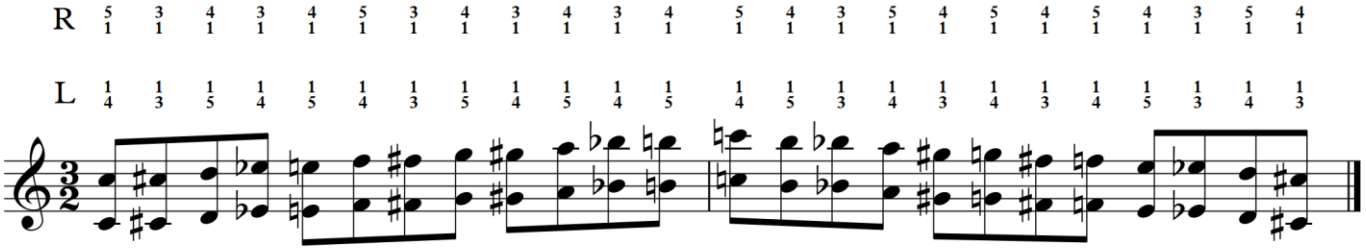
Exercise 7b: Melodic Legato Octaves

Paul White

First repeat exercise 7a using the same fingering, but adding the thumb and octave below in the right hand and an octave above in the left hand. People with small hands could reduce the interval to a sixth. Play the outer notes (3rd, 4th and 5th fingers) forte and legato, resting arm weight on these notes. Lift the fingers high and bring them down swiftly on to the keys, even in slow tempo. The thumb carries hardly any weight and is not lifted high. It touches lightly on the keys, and does not need to be completely legato. Also practise with the outer notes still forte and legato but with the thumb played in a quiet staccato, or, alternatively, "Shadowing" by silently touching the surface of the keys. Then "Split" the octaves as shown in the following examples, with the outer fingers on the strong beats. Exercising the outer fingers in a stretched octave position is very valuable, although it cannot be carried to a high speed. The exercises can be extended over a wider range.



In the next exercise, the fingering for the outer notes is the same as one often used for double chromatic minor 3rds.



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Exercise 7c: Velocity with outer fingers

Repeat each section several times rapidly without a break until tired. Then do the same with the other hand. The first 2 sections can also be played with fingers 2 3 and 4.

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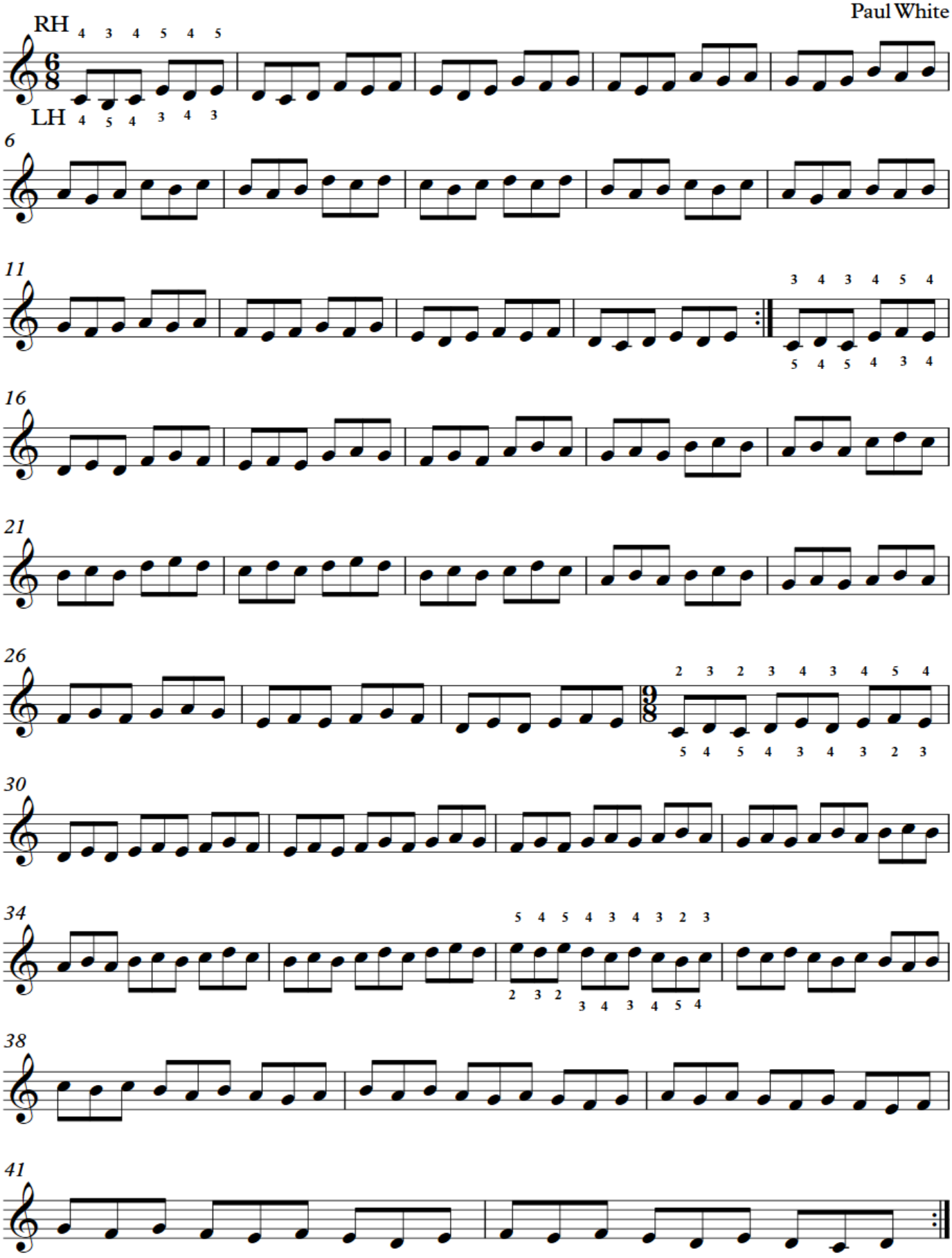

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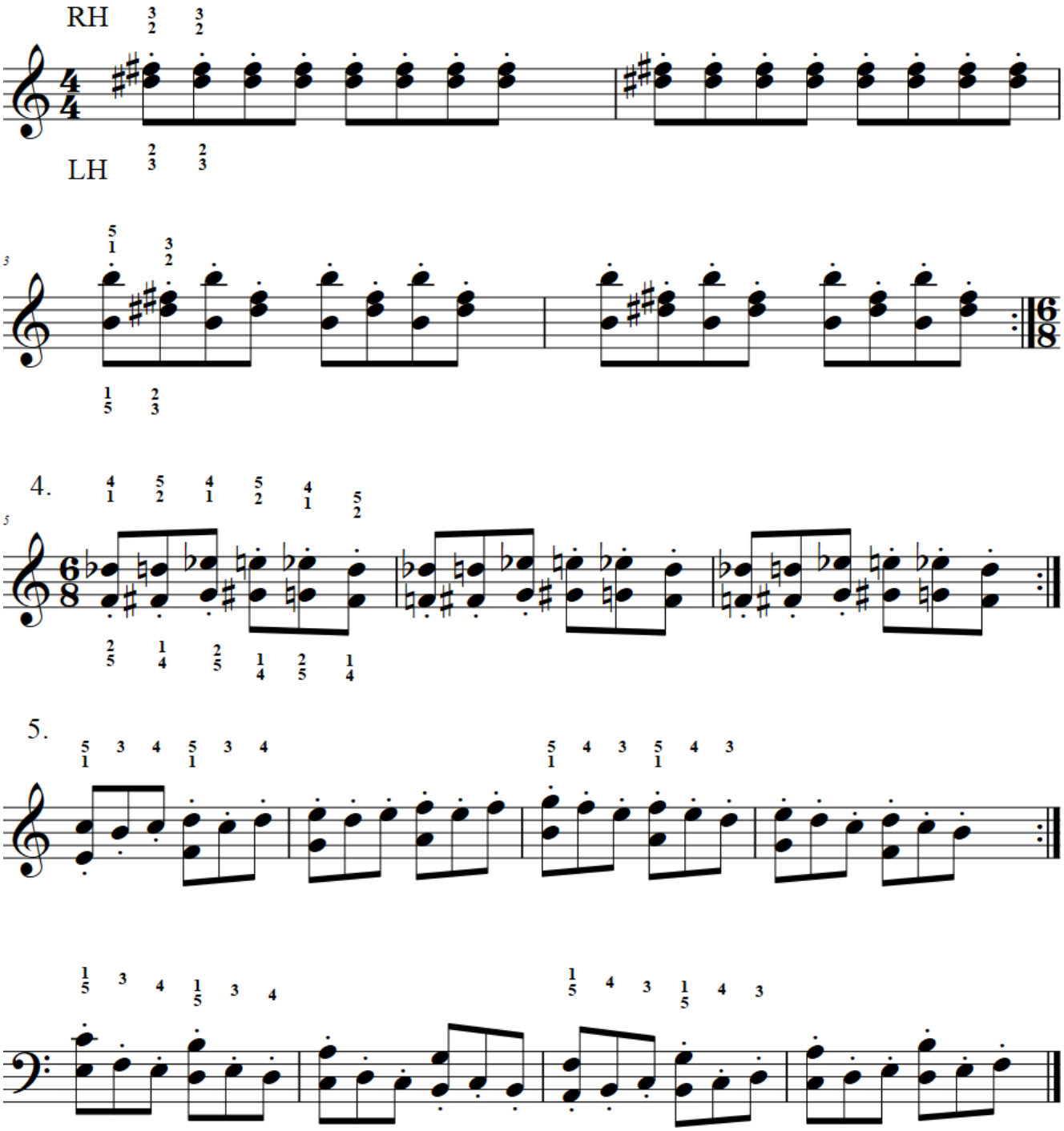
Exercise 8a: Staccato

1. "Shadow box" towards the piano lid with a relaxed fist, turned horizontally.

2. Repeat the action, but releasing the wrist so that the hand is thrown up and down. At the same time, play repeated staccato notes on E flat using the middle joint of the third finger. When playing with two hands, the movement should be felt through the whole body, including the back of the neck.

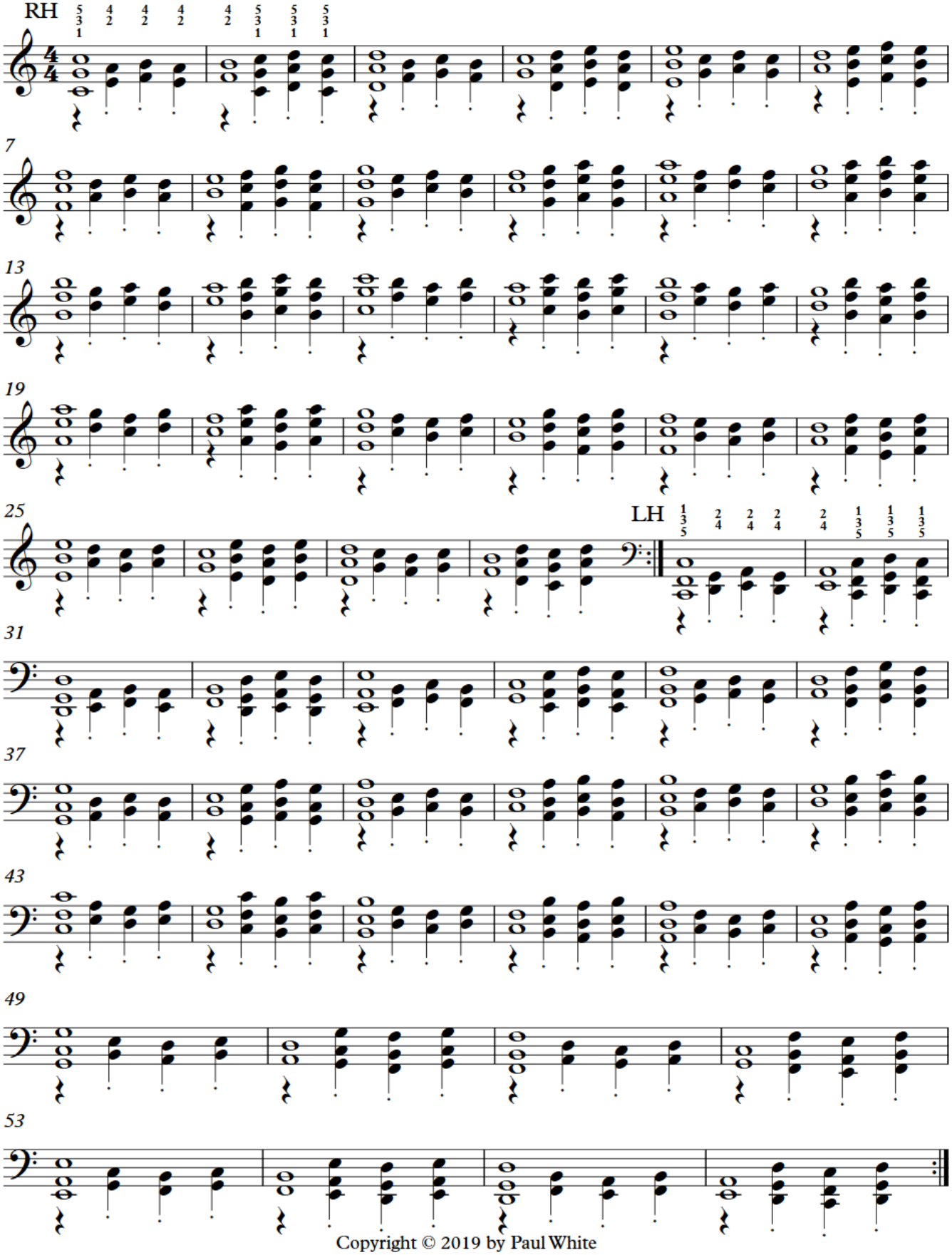
3. Release the fingers into a normal playing position. The hand and fingers are entirely passive, all the action being driven by the forward and backward movement of the elbow. Play each exercise slowly then gradually increase the speed.



Exercise 8b: Finger Staccato

Paul White

Play firmly. Rest arm weight on the sustained notes, and use a strong finger action on the staccato notes. Use fingers only, avoiding arm movements. The thumb notes can be omitted if desired.
For an explanation, see p. 16 of the guide.



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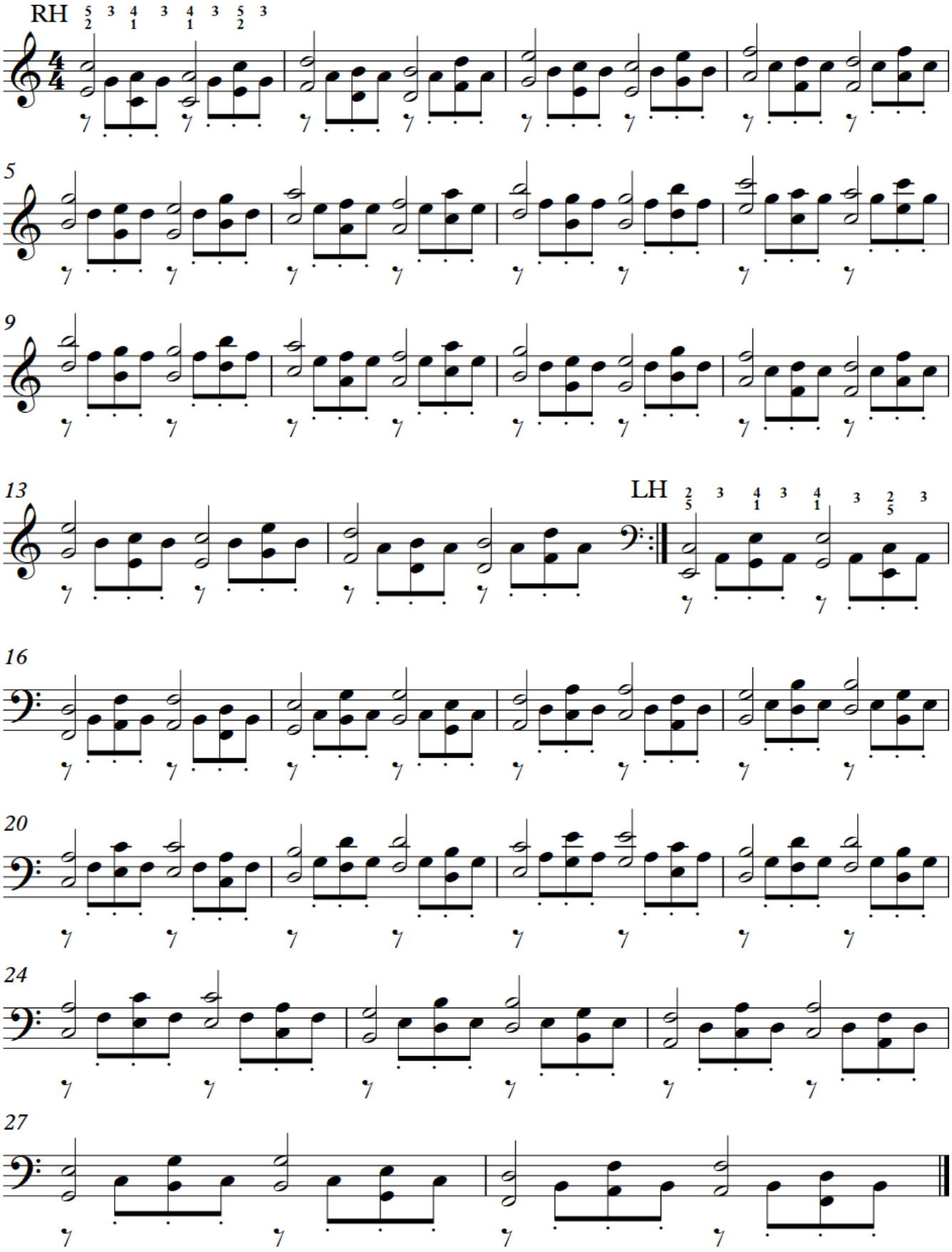
Exercise 8c: Finger Staccato

Paul White

Rest arm weight on the sustained notes and play the staccato notes with a strong finger action.



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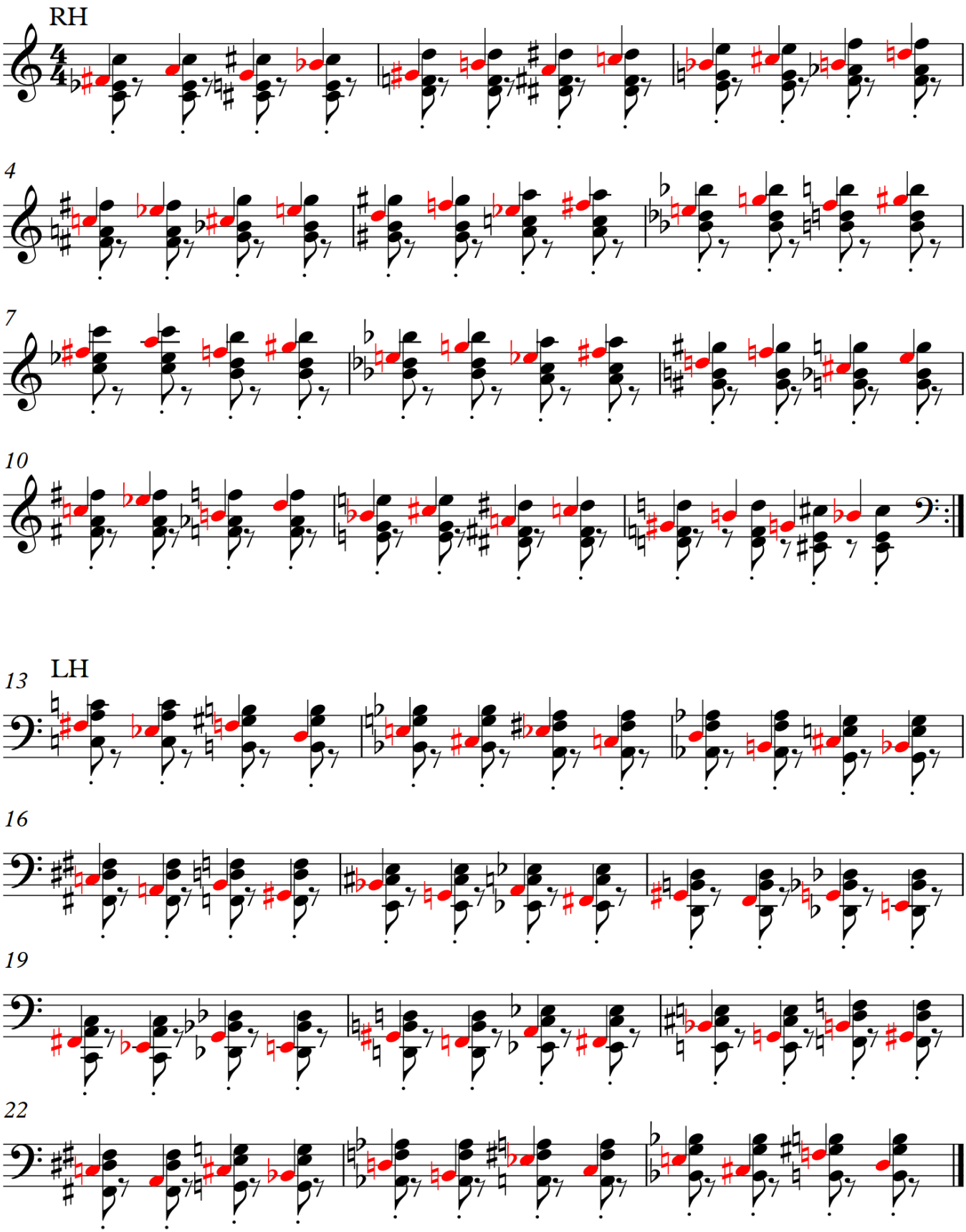
Exercise 8d: Legato and Staccato

All the notes are played strongly with well-lifted fingers. Arm weight is rested on the red notes, which are played legato.

Paul White



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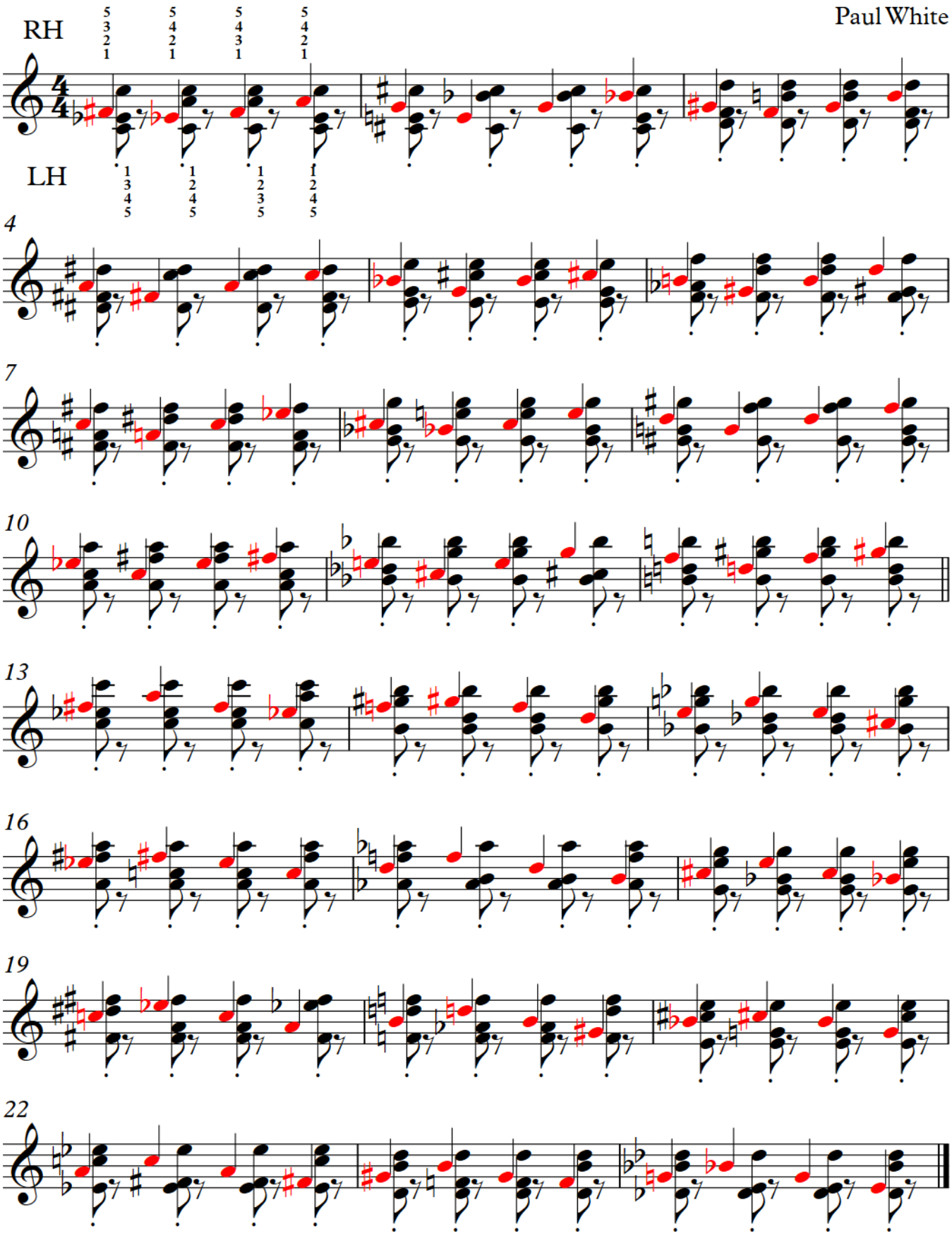
Exercise 8e: Legato and Staccato

All the notes are played strongly with well-lifted fingers. Arm weight is rested on the red notes, which are played legato.



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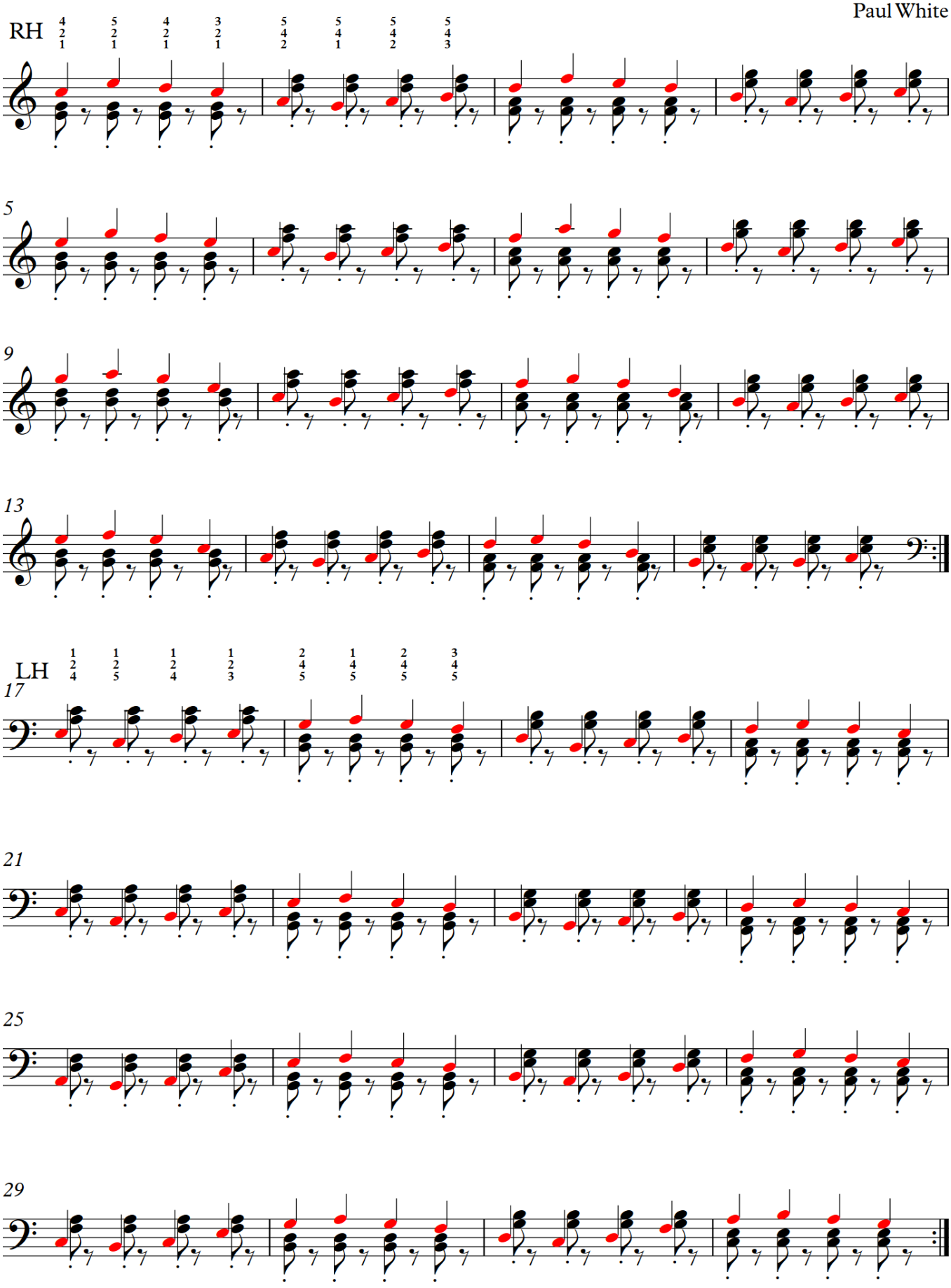
Exercise 8f: Legato and Staccato

All the notes are played strongly with well-lifted fingers.
Arm weight is rested on the red notes, which are played legato.

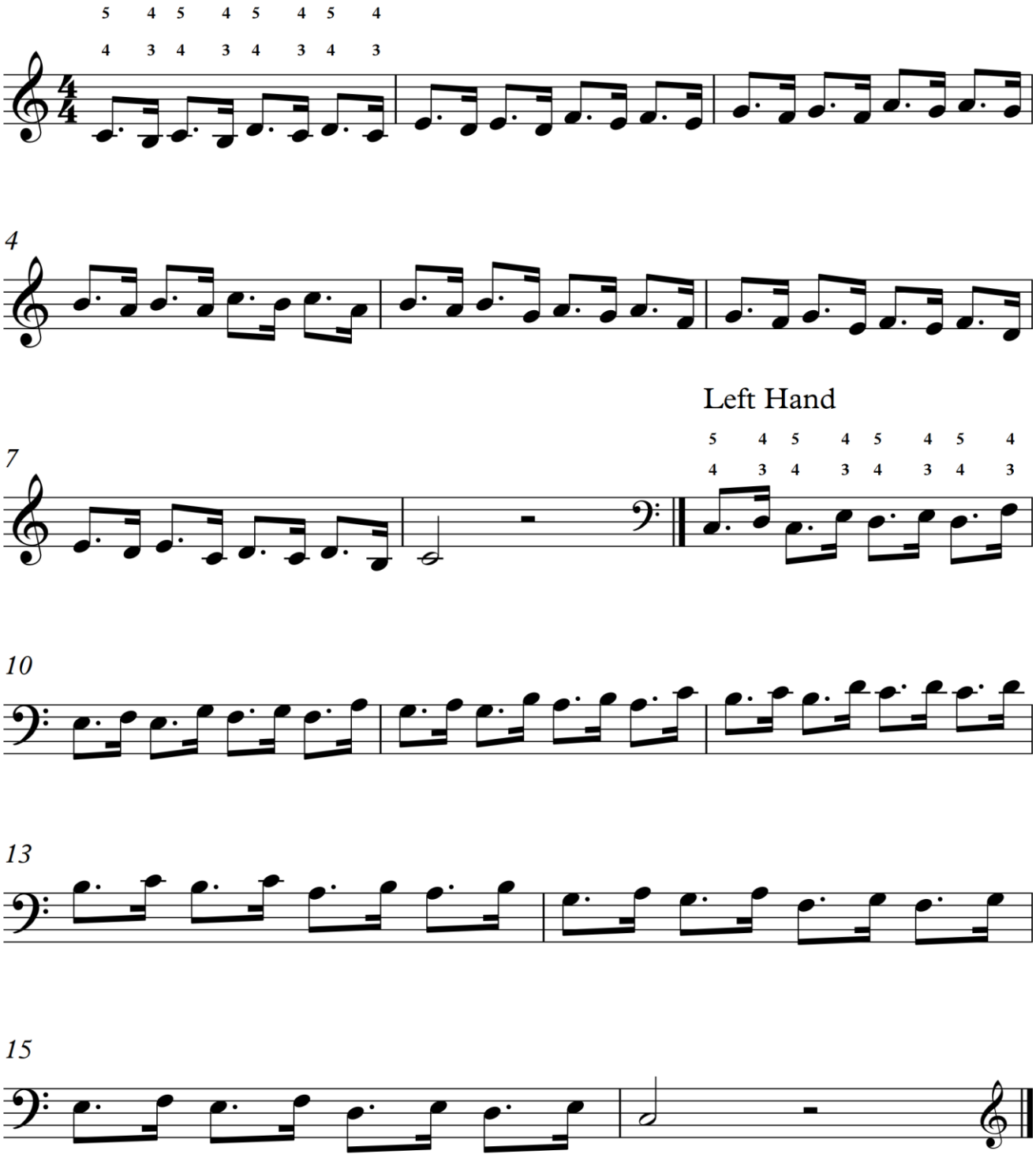
Paul White



Exercise 9 Rhythmic Evenness

Paul White

When certain pairs of fingers are alternated rapidly, a natural unevenness results. The rhythms here are the opposite of the natural unevenness, and serve to counteract it. The thumbs are not used.



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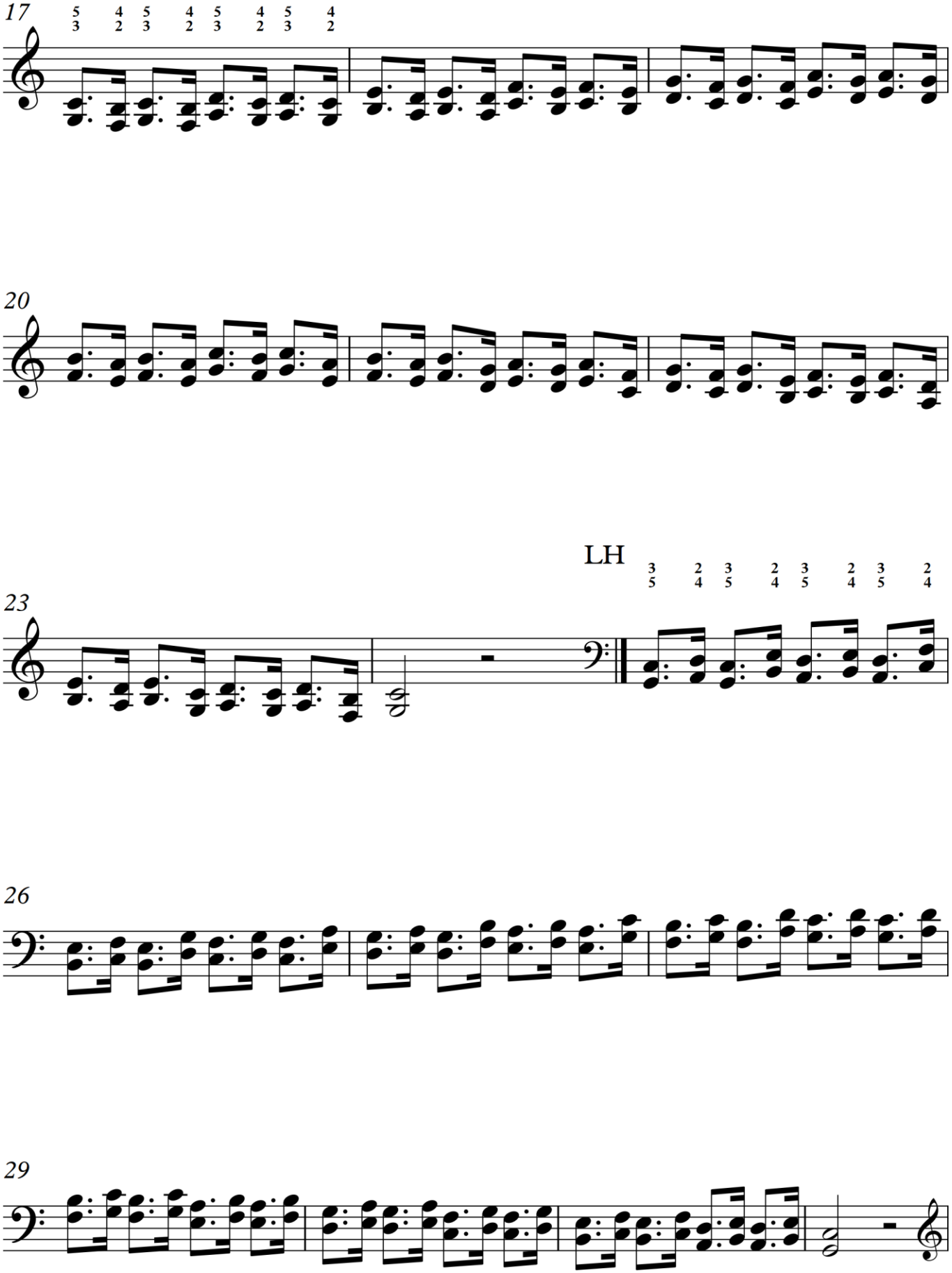
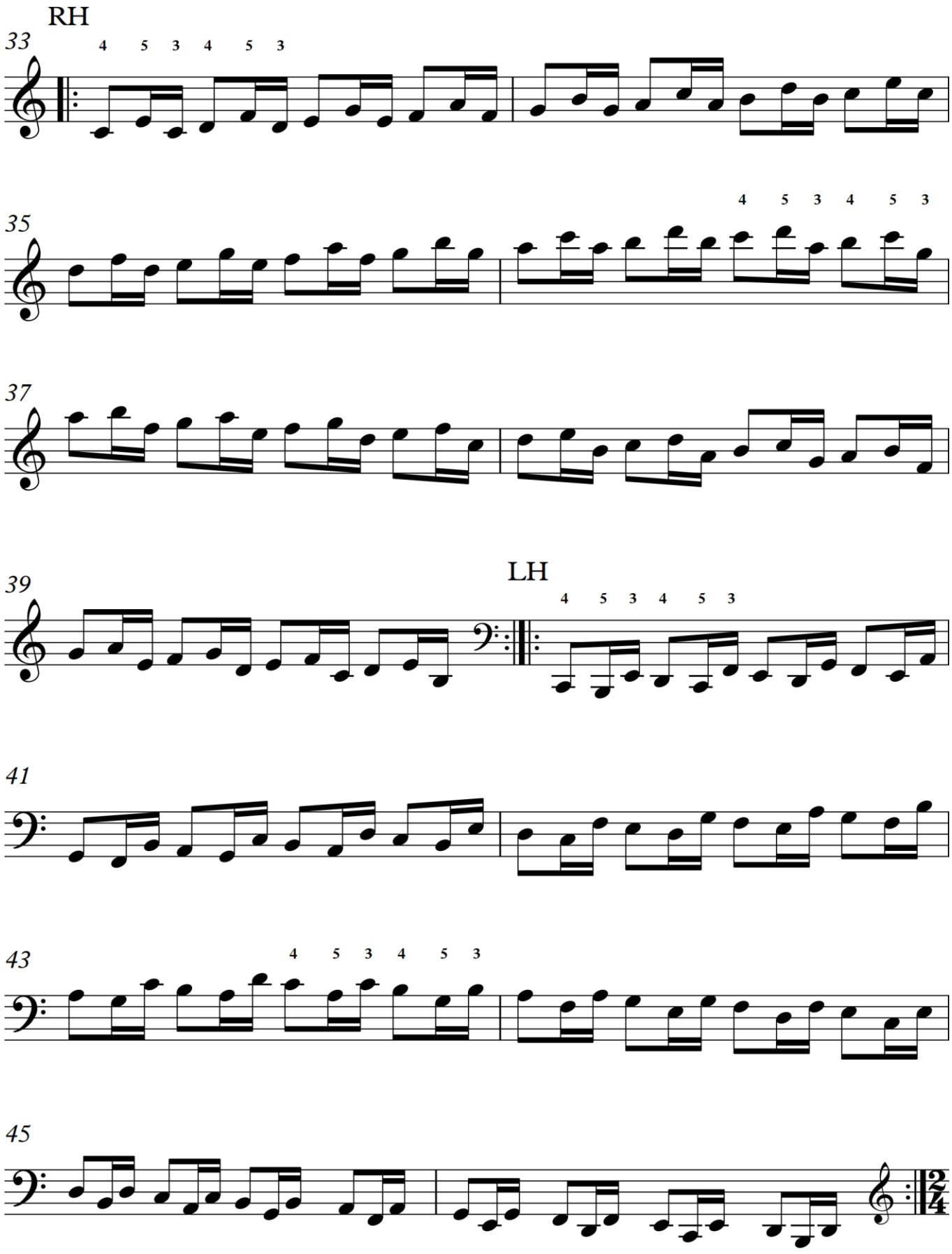
Exercise 9B rhythmic evenness

RH



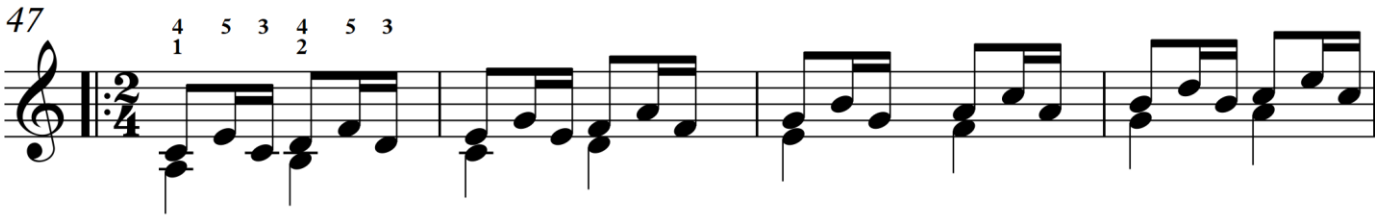
Exercise 9C rhythmic evenness

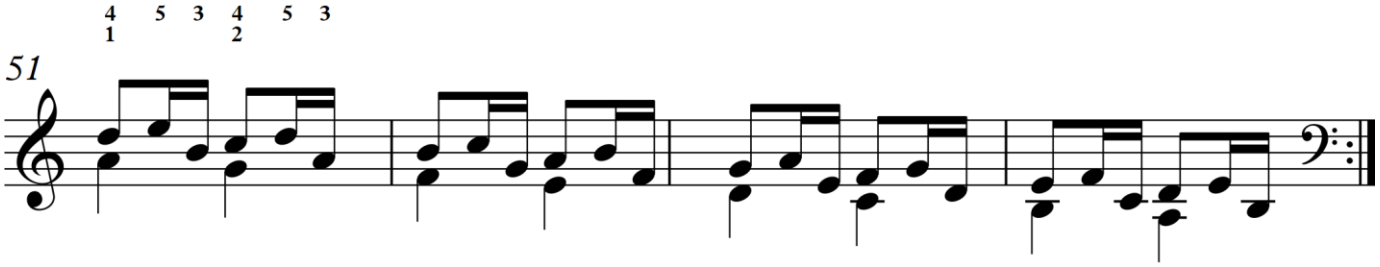
The right hand and left hand parts can also be swapped in this exercise.



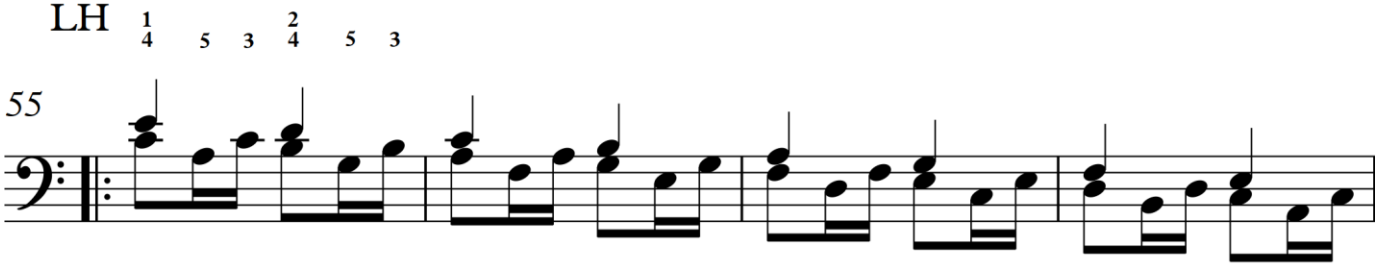
Exercise 9D rhythmic evenness

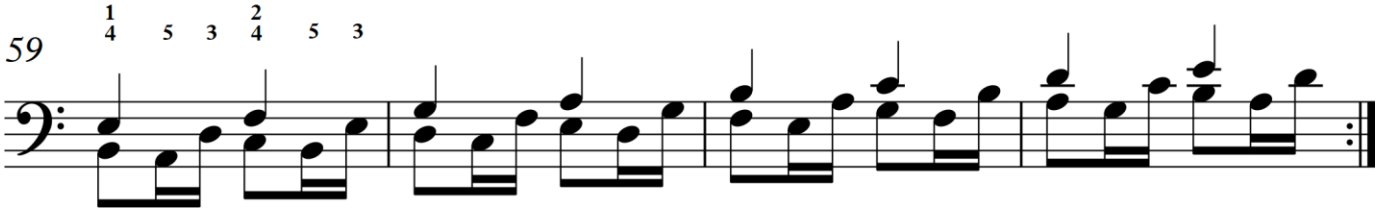
RH





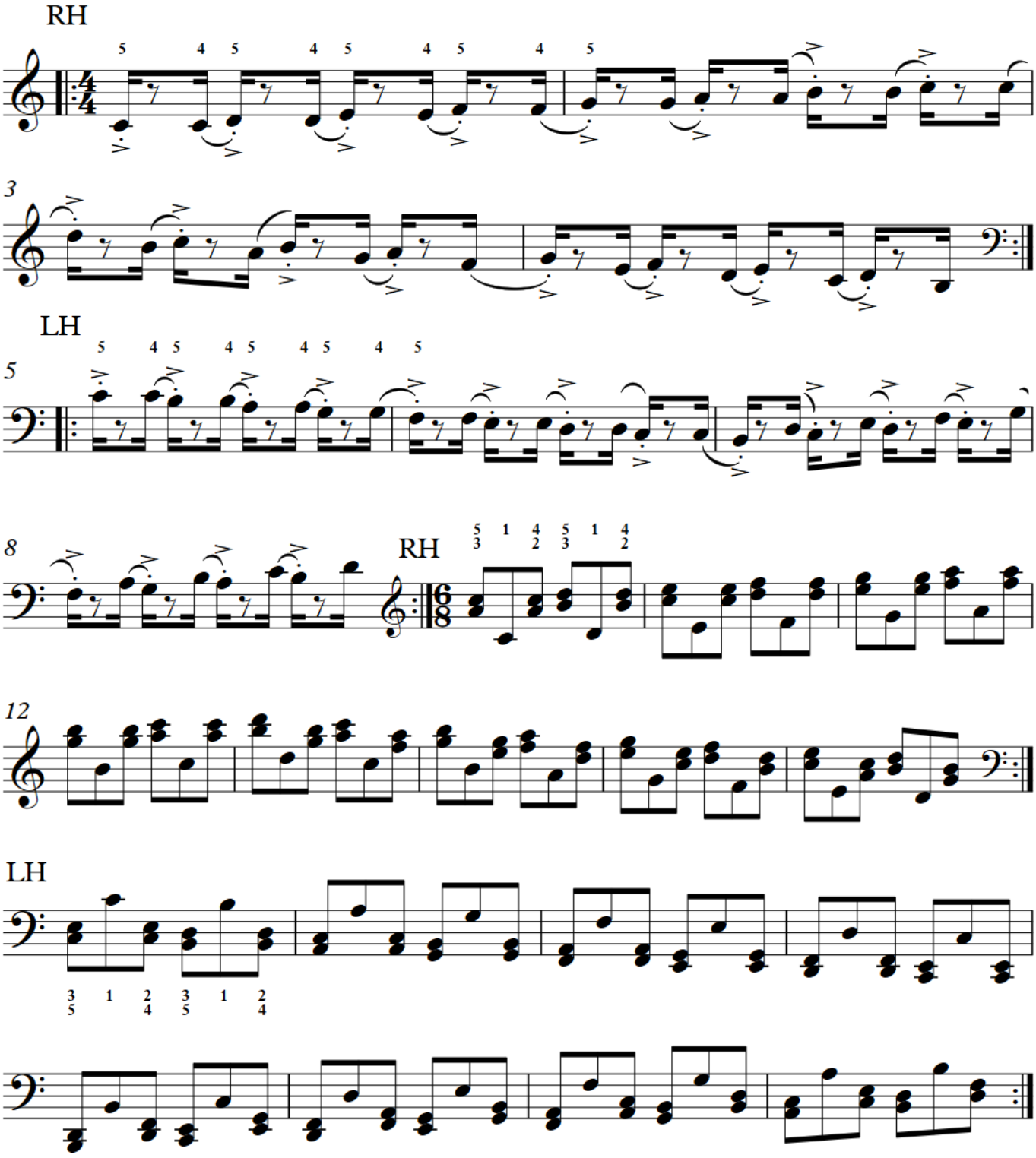
LH





Exercise 9E: Rhythmic Evenness.

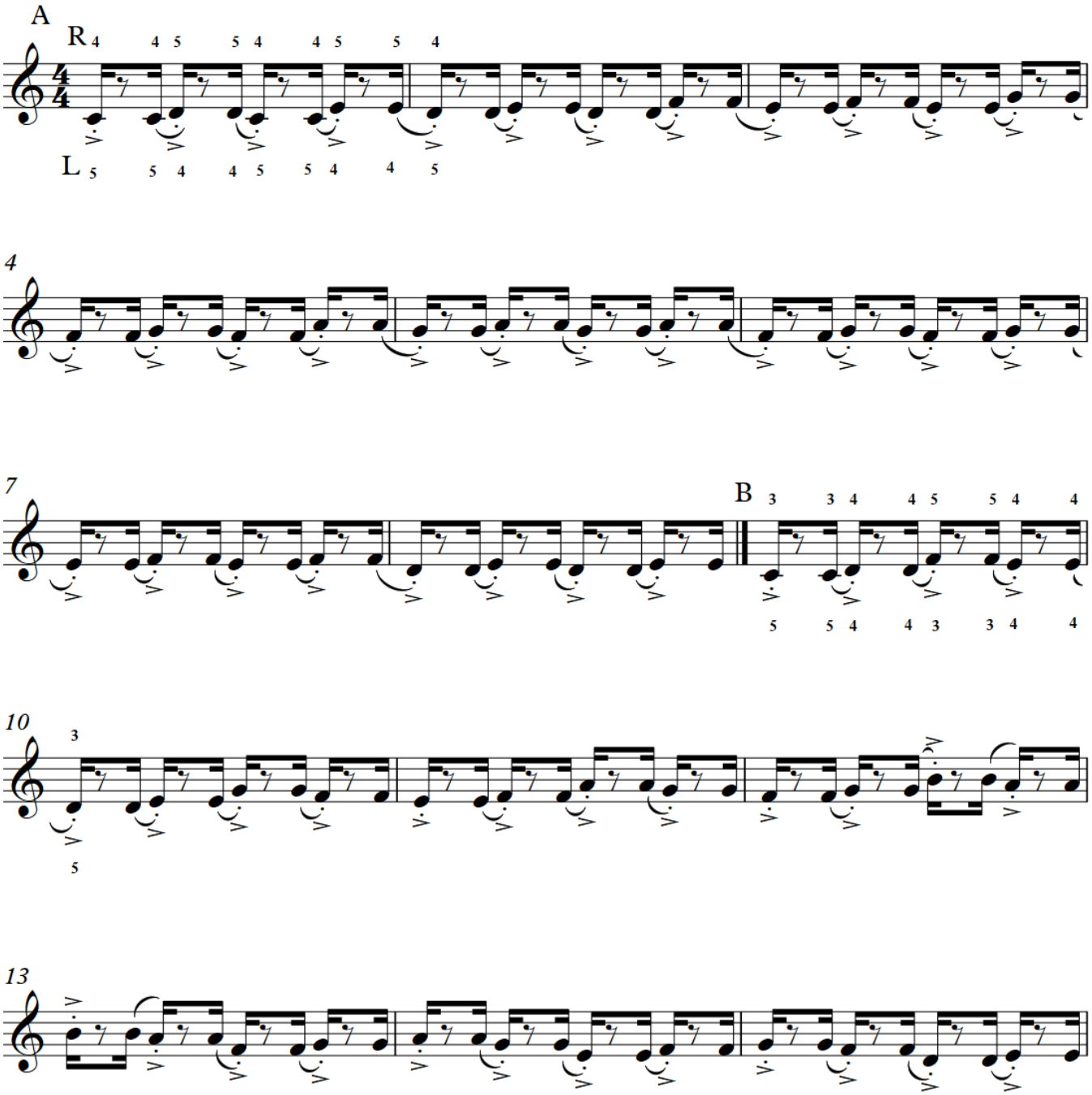
Moving from a longer, stronger finger to a shorter, weaker one is more difficult and takes longer than moving in the opposite direction. Therefore, when trilling between fingers 4 and 5, something like a "dotted" rhythm may occur, with the longer note played by the 4th. This exercise practises the difficult move rapidly, almost like a "grace note". For maximum benefit, repeat the right hand rapidly several times until tired, then rest the right hand whilst practising the left. Alternate the hands several times. Also practise the exercise using fingers 3 and 4 instead of 4 and 5.



Exercise 10a: Accented Finger Staccato

Paul White

In slow practice, "Prepare" the note about to be played by placing the fingertip on the surface of the key. The other fingers can also rest their tips on the key surfaces where possible. The wrist is fairly low, with the hand supported by the upward pressure of the keys. A sudden downward finger stroke drives the key down and pushes the arm upward at the knuckle. The finger also pulls slightly backwards (bends) as it plays. *Do not arch the wrist*. This remains low but not stiff. The arm flies up into the air, creating a very strong staccato note, then falls back to land on key surface again, preparing the next note. At higher speeds, the surface preparation is absent, with the arm "Bouncing" from key to key. First practise by repeating each finger on a monotone, then by using the staccato on each note of an exercise or passage. Then practise the following slurred exercises. The slurring can also be used in practising passagework, either repeating each note with a "Skipping" action as in sections A and B or slurring from note to note as in sections C and D.



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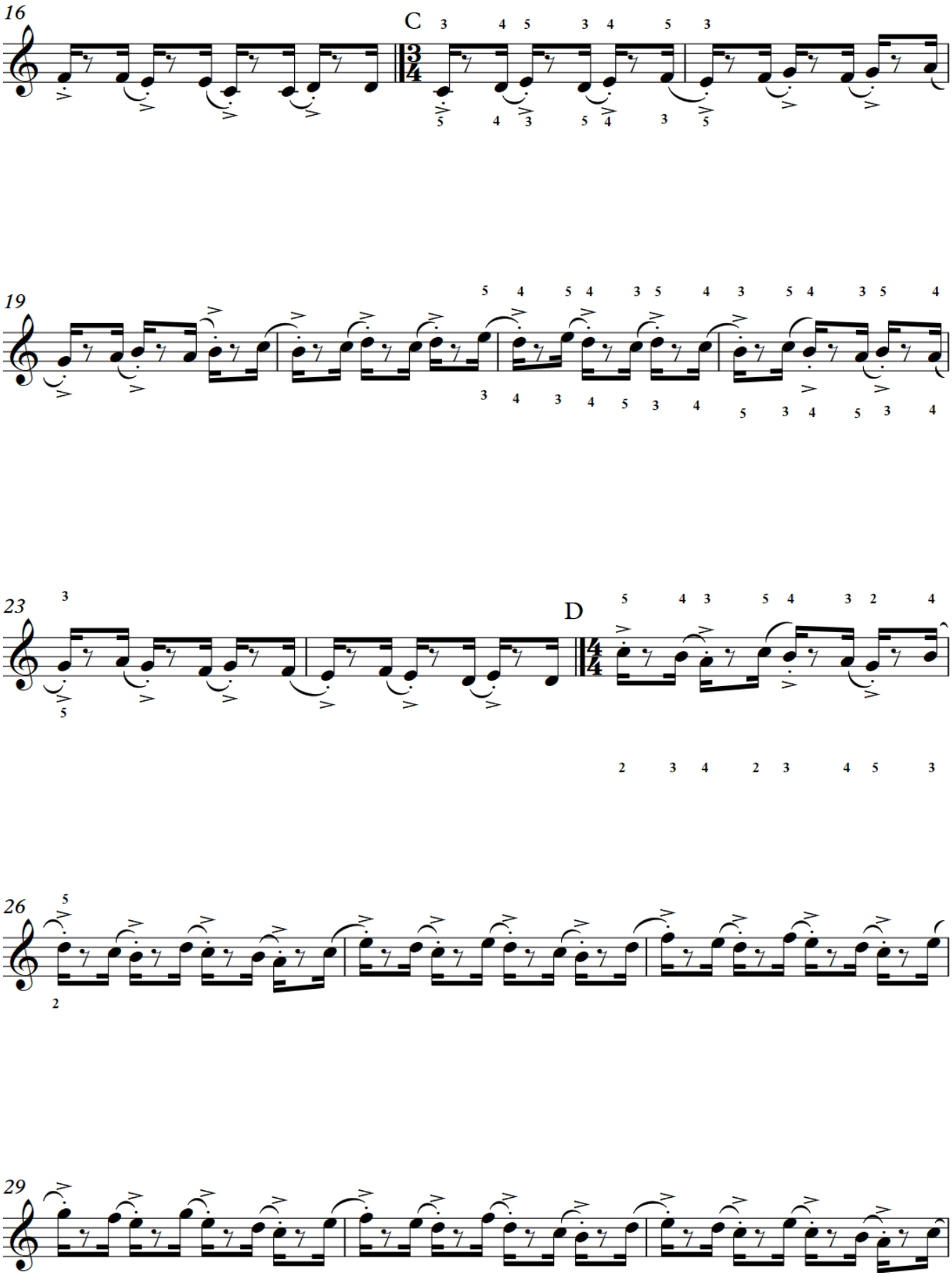
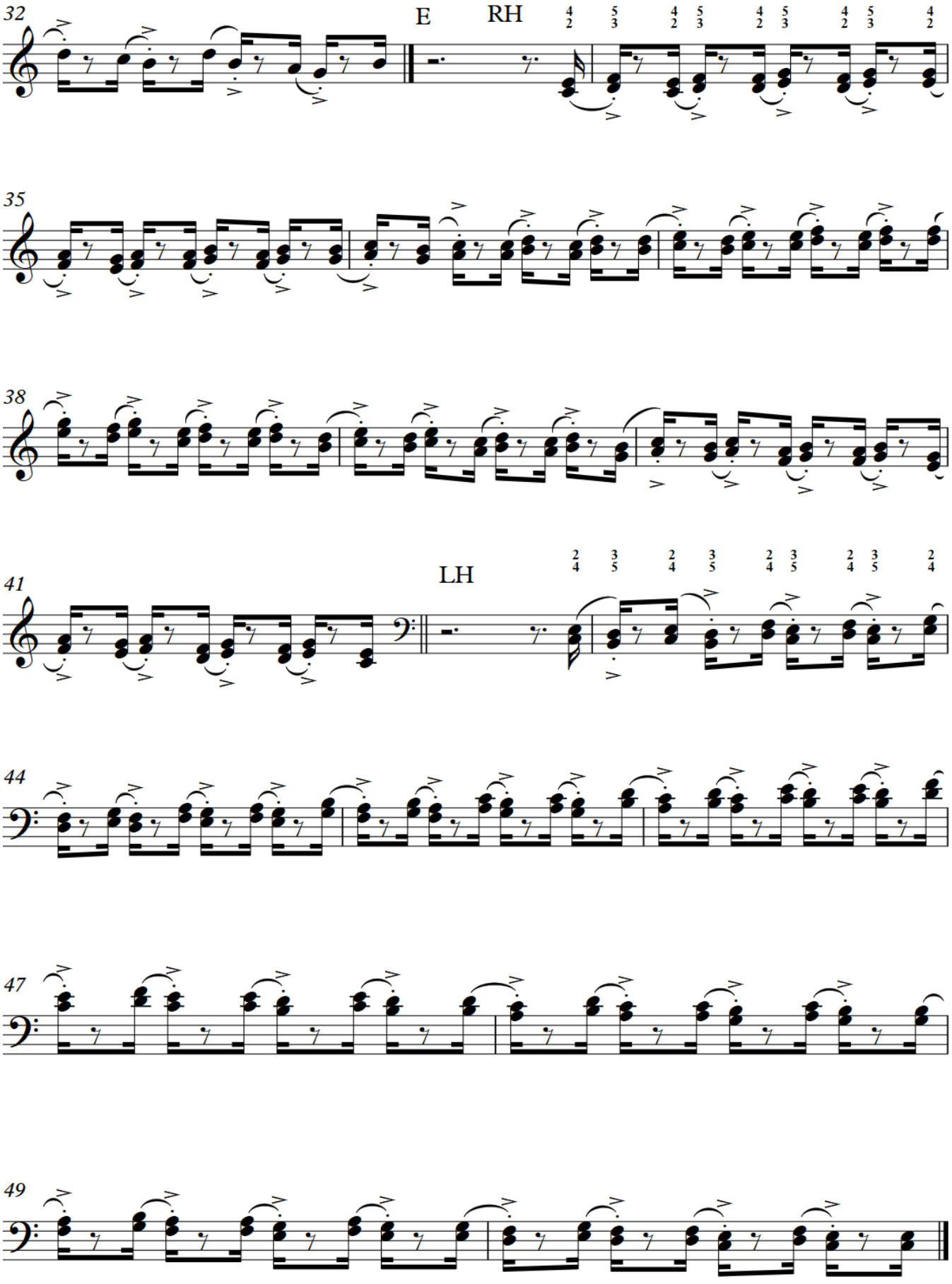
Exercise 10a page 2



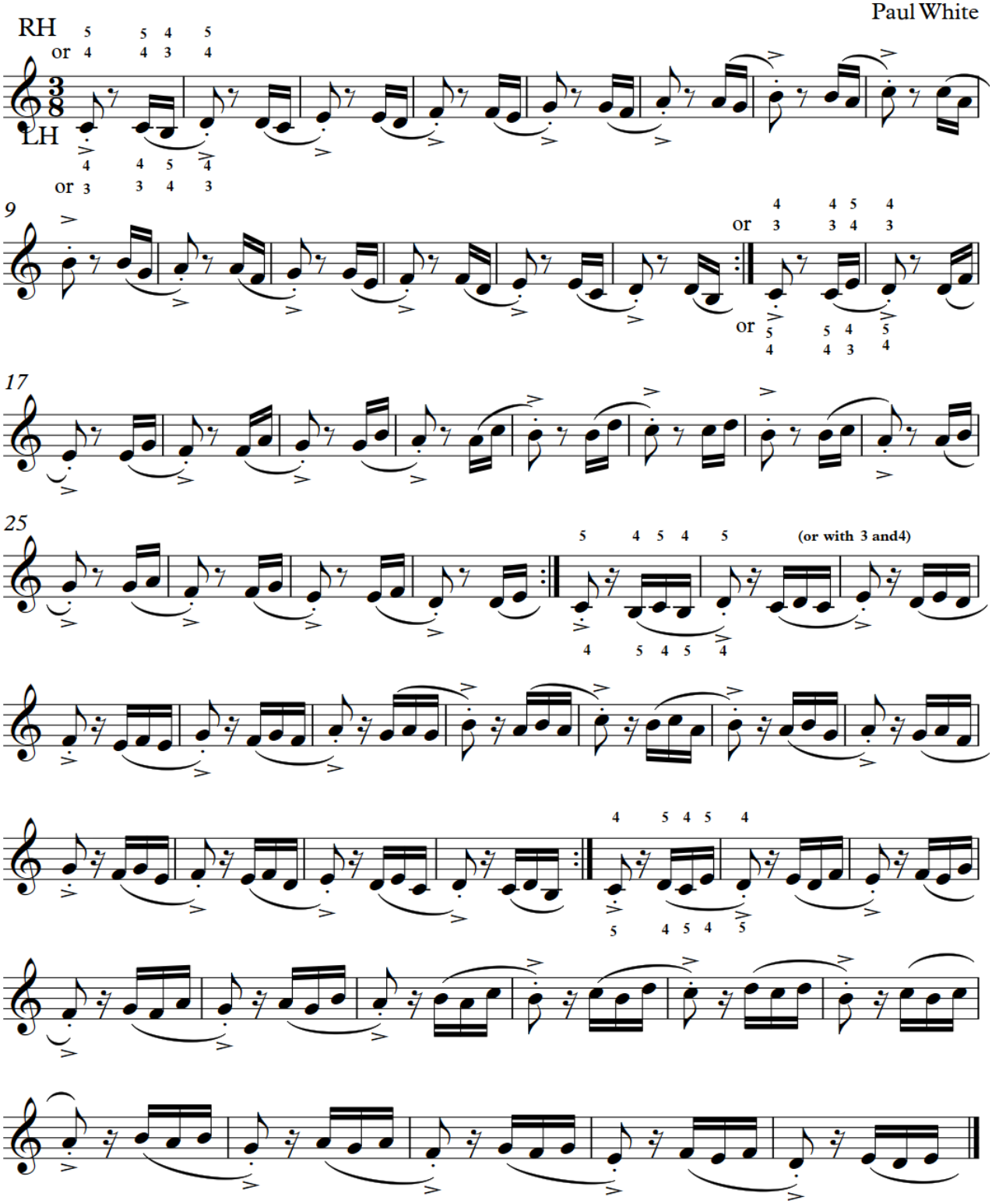
Exercise 10a page 3



Exercise 10b: Ornaments

This exercise does not need to be practised slowly. Begin at a moderate speed and work up to a very high speed. Play each section with one hand then the other, so as to rest each hand between exertions. Each exercise can be played with either the 4th and 5th fingers or the 3rd and 4th fingers. The 2nd and 3rd could also be used although this would be very easy. Do not arch the wrist on the accented staccato notes. Do not aid the fingers by rotating the hand.

Paul White



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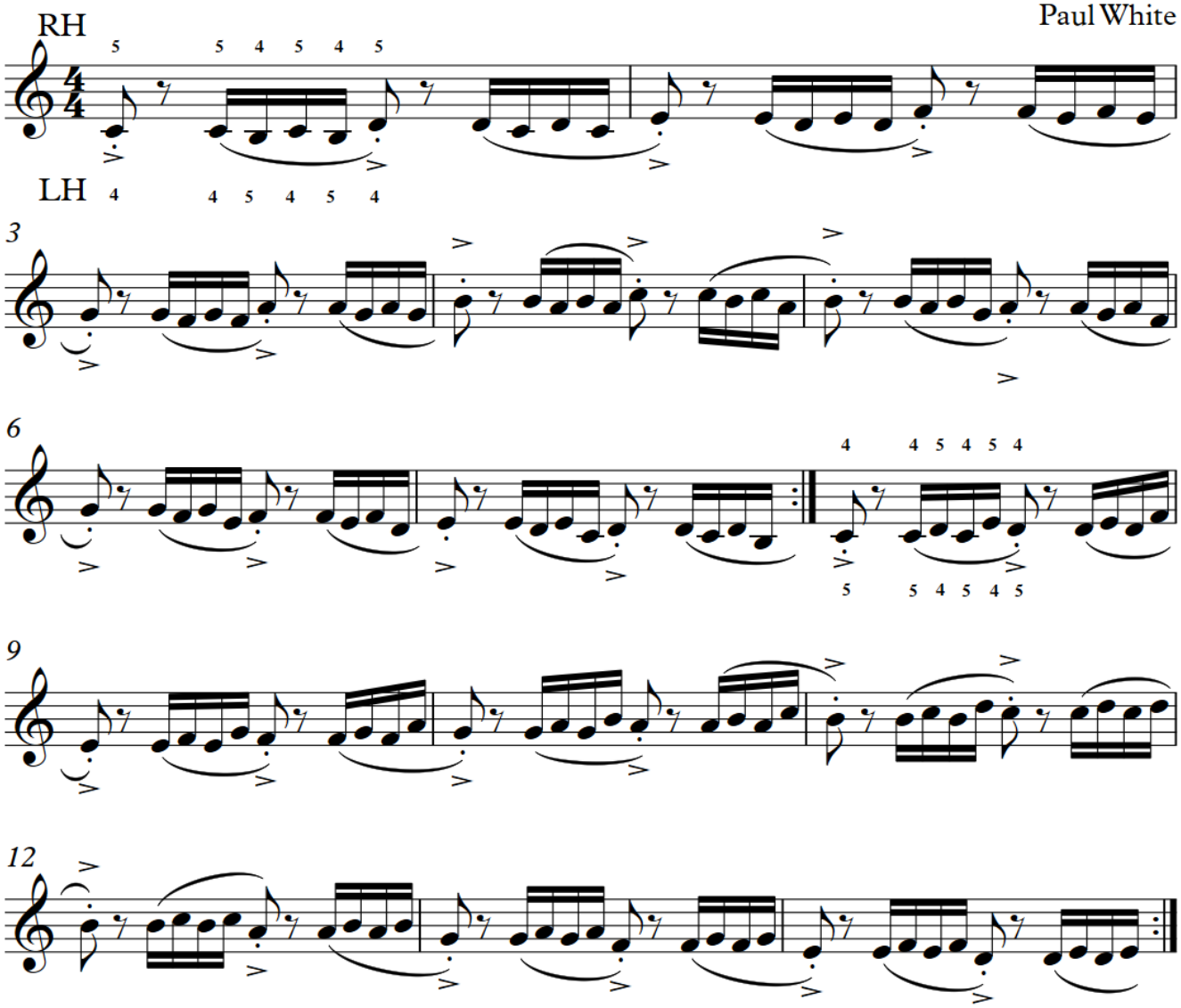
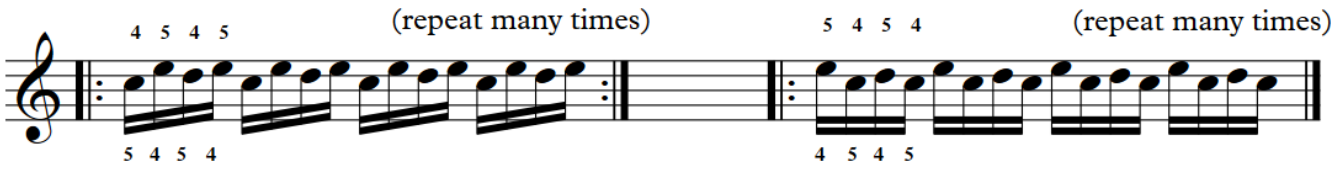
Exercise 10c: Ornaments

Repeat using each pair of adjacent fingers. Begin at medium speed and work up to very high speed. Do not arch the wrist on the accented notes. Do not aid the fingers with rotation of the hand.

Paul White



Play a trill between two adjacent white keys using fingers 4 and 5, as fast and for as long as possible, until the muscles are tired. Rest the hand whilst repeating the same trill with the other hand. Repeat the whole process with each adjacent pair of fingers. Then use the same method with the following exercise.



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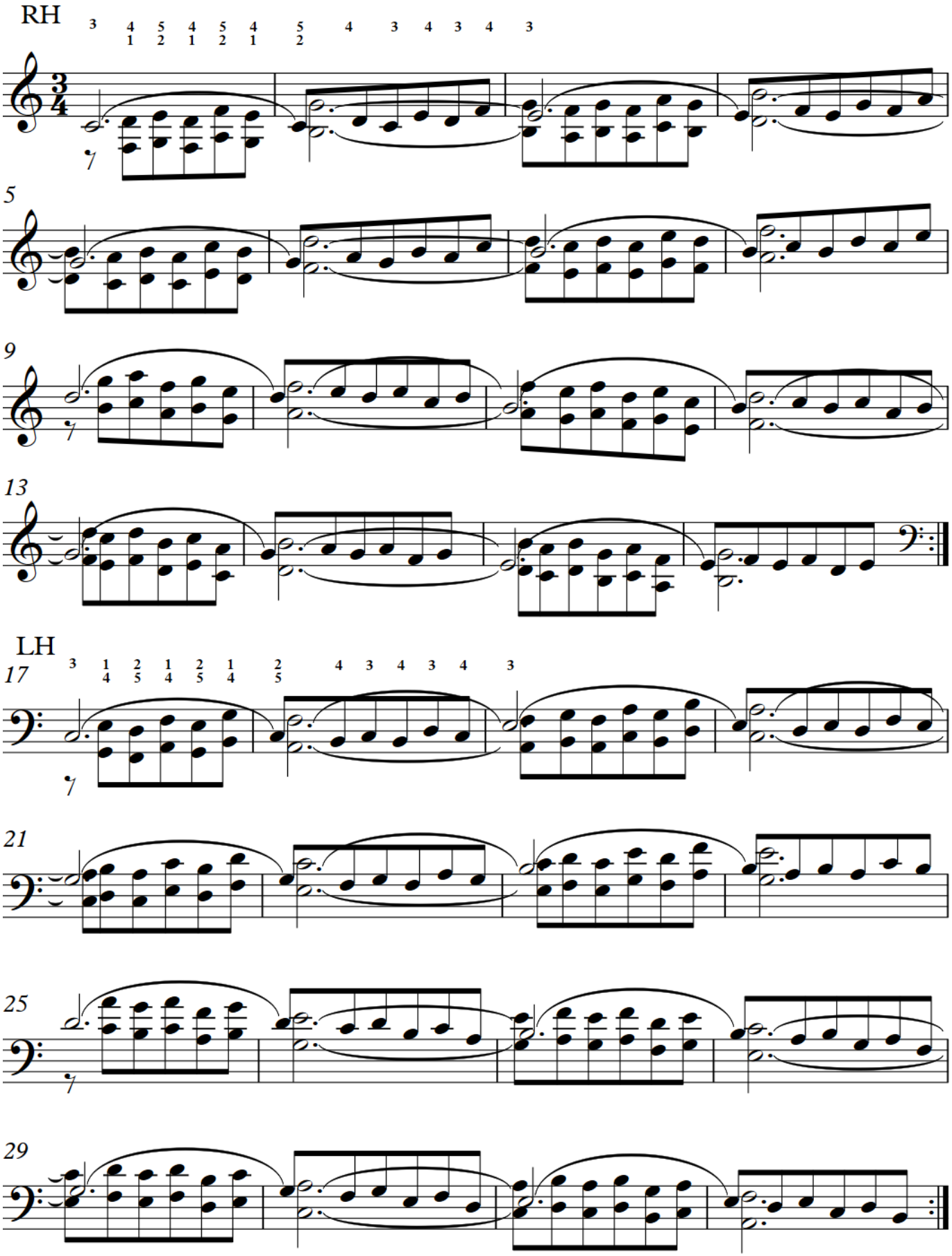
Exercise 11a: Lateral Stretches

Paul White



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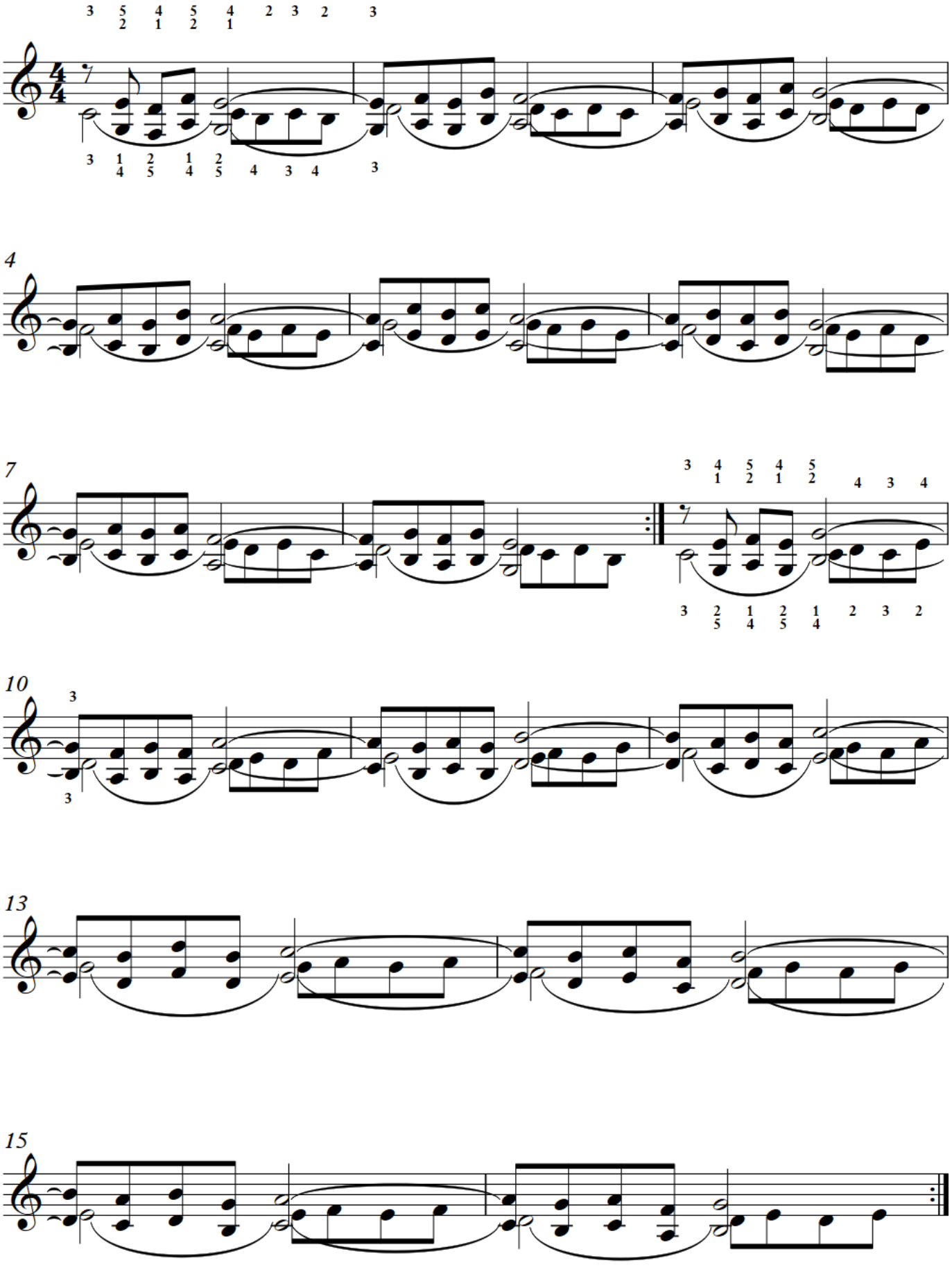
Exercise 11b: Lateral Stretches

Extend to one octave.

Paul White



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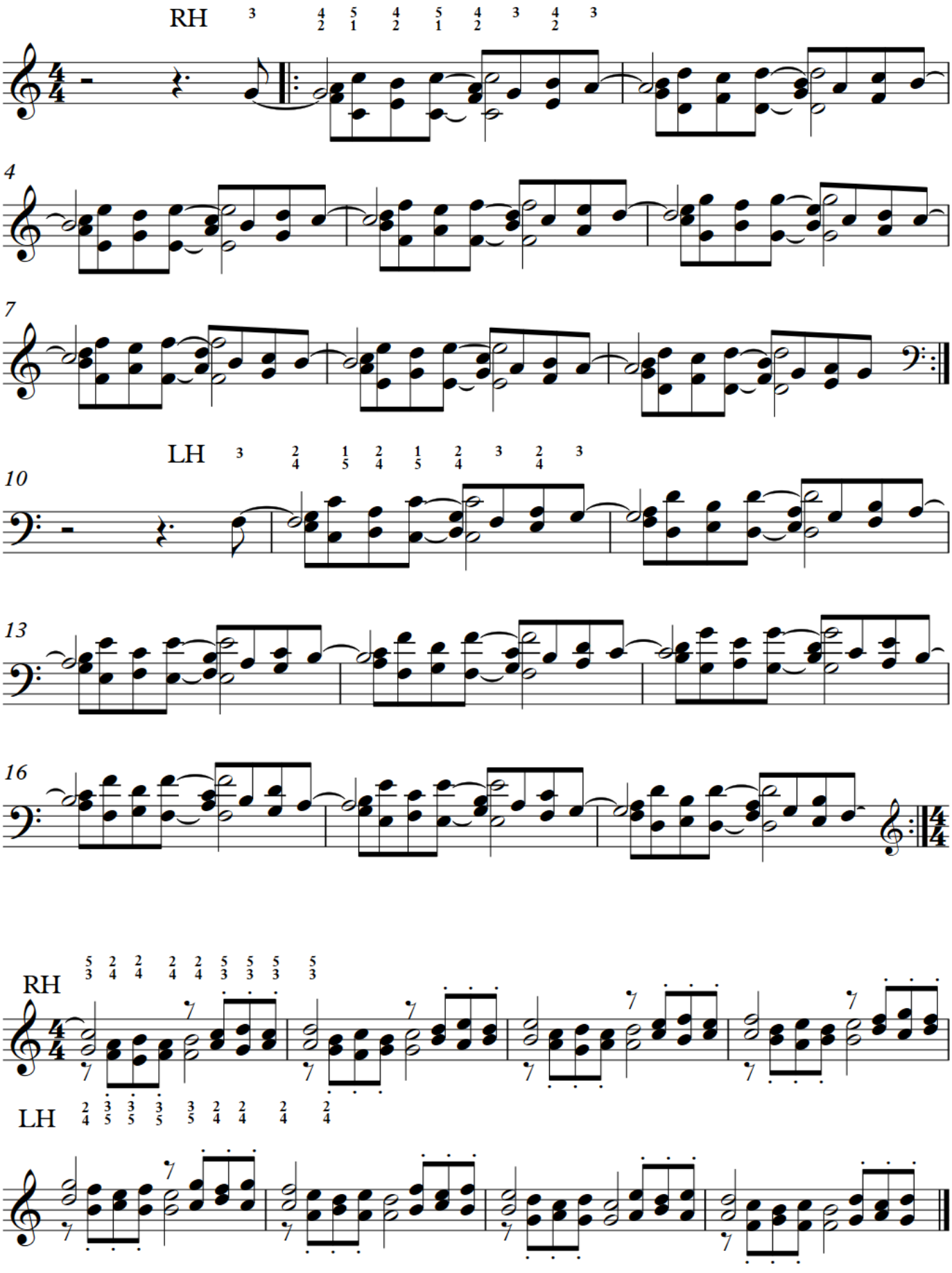
Exercise 11c: Lateral Stretches

Paul White



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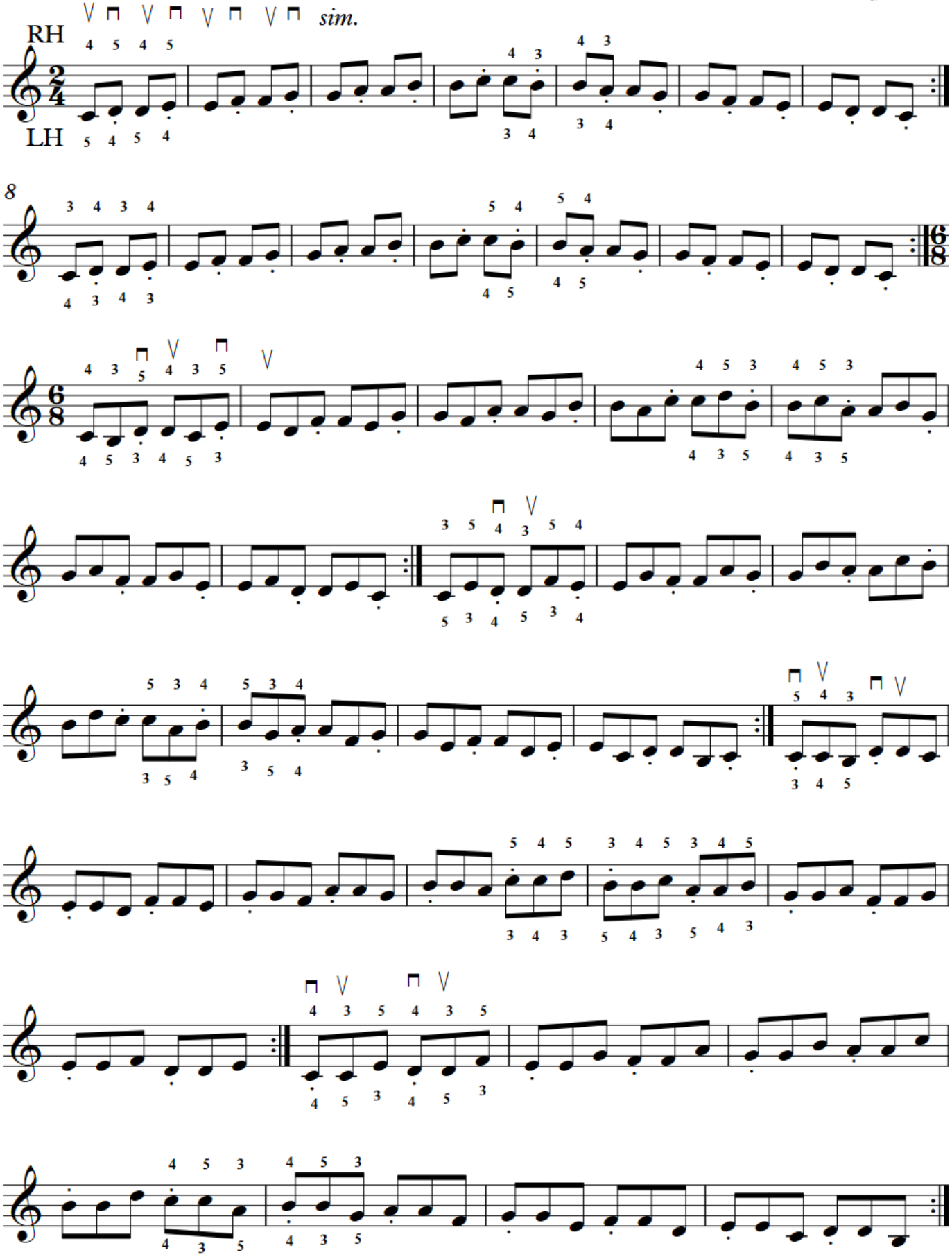
Exercise 12: Repeated Notes

∨ = wrist up ⊓ = wrist down. Also play with fingers 2 and 3.

Paul White



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