MODERN PIANO-TEACHING

BY

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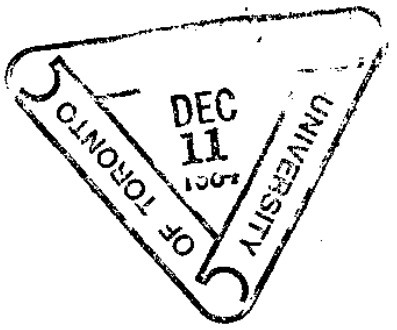

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TABLE OF EXERCISES.

CHAPTER I.

INTRODUCTORY.

In the following pages I have endeavoured to show the practical application to Piano-playing of the principles of Arm-Rolling movement, and muscular Tension. During the last twenty years these principles have been engaging the attention of many teachers of the Piano, and, in the case of some, have been responsible for a re-modelling of their methods. This revival of interest in the study of the development of Piano-teaching has largely been brought about within that period by the publication of several notable contributions to the literature of the subject. Among these, the treatises of Bandmann, Breithaupt, Caland, Clark-Steiniger, Matthay, Raif, and Dr. Steinhausen have perhaps done most to draw the attention of teachers to the need of some reform in teaching the technical department of their art, and to the necessity for developing, from the beginning, the piano-playing of the youngest pupil along lines which previously had been traversed by the great players alone.

The fact that there does exist a marked difference between the pianistic Results of, on the one hand, the traditional teaching of most of the "schools," and on the other, of the performances of great artists, has become more and more recognised. And it has become evident to the keener among critics that this difference of Result arises not only from a difference in the degree of musical talent possessed, but also from a difference in the use made of the playing powers belonging to the body. The artist uses these powers to

their full extent, and in accordance with the dictates of physiological laws; the school-man makes only partial use of them, and often in defiance of these laws. The great pianist is an expert in applied mechanics, as well as a gifted and trained musician. He so uses his physical powers in conjunction with the highly developed mechanism of the Piano as to bring out the instrument's greatest variety of Tone. He accordingly — consciously or unconsciously — rejects much of the technique taught at present in the "schools," and — similarly — he adopts much that they ignore. This arises from his clearer perception of what the Arm is capable of. He knows its wide range of movement, and its dependence for motive power on the tension of the muscles lying on the back and chest. He uses the hand and fingers passively, as far as that is possible. He has discovered the value of the rolling-motion of upper-, and fore-arm, in tone-production. And lastly, he regards the arm as a Whole, and consequently makes use of its adaptability for being swung, at the shoulder, from one part of the keyboard to another. All this, when embodied in piano-playing, creates that difference in tone spoken of above. And it has also a side personal to the performer. It gives him the sensation of ease while playing; and, at the same time, it confers on his performance the appearance of freedom from bodily constraint.

In the course of the following pages I will take the liberty of quoting occasionally from the writings of some of the authors previously mentioned.

It is earnestly hoped that the student will not only read the directions given in the following pages for each of the Exercises, but will also, to the best of his ability, experiment with them at the keyboard.

CHAPTER II.

KEY-PROPERTIES.

SECTION 1.

Of all musical instruments the Piano would seem to be the one whose mechanism is least understood by those who devote themselves to its practice. Players on other instruments take a rational interest in the build and tone-producing capabilities peculiar to the class of which they make a special study. But the piano-student, in many cases, is content with knowing no more about his instrument than that it has wires, hammers, keys, and pedals. And an intimate knowledge of the properties of that part of the piano which is for him the sole medium of tone-production, viz. the key, is too often conspicuously absent.

I do not contend that a knowledge — even the most intimate — of the inner mechanism of the piano and of the lever-principle of its key will teach the student how to apply Energy correctly to the keyboard. But an appreciation of the fact that the piano-key is nothing more nor less than a Lever, and must therefore be treated as such, is surely not too much to ask of anyone who would interpret the works of the great composers. And yet nothing is more commonly met with than the type of pianist who has spent years in trying to master difficult compositions, and who, for the reason that, from the beginning of study, he has failed to understand the kind of work to be expected from the key-lever, is still unable to produce tone correctly.

SECTION 2.

It would seem that the key of the piano must possess something mysterious in its nature, seeing that a wrong use of it is so frequently met with, and can do so much harm to the student's tone-production. In his book "The Act of Touch," Mr. Matthay illustrates the simplicity of the key's working when he likens its action to that of a s e e-saw. This comparison gives an excellent idea of the key's reciprocal up-and-down movement. The celerity of the upmovement of its near end may be proved to the student if he will place a finger on the surface of any undepressed key and lightly jerk it down to low-level by very swiftly drawing the finger into the palm of the hand. The extremely quick return of the key to its high-level argues that at the far end there must be weight sufficient to overbalance the weight at its near end: in other words, that the key-lever is heavily weighted on the far side of its fulcrum. To hold a key down, therefore, is to continue to overbalance the weight at its far end by means of weight from the arm.

SECTION 3.

If experimental tests be made of the resistance-power of any one key, some curious facts may be elicited. (By "resistance-power" is to be here understood the key's power to push up against weight applied to its near end.) It will be found:

(1) That the least weight that can overcome the resistance-power of a key is the weight which, if laid on the key a f t e r i t h a s b e e n p u s h e d d o w n t o l o w-l e v e l, will just hold it there and keep it from moving.

(2) That a greater weight than that mentioned in test No. 1 may be laid on the surface of that same key w h e n

at high-level without causing it to show any sign of being affected by the pressure of that weight.

(3) That a still greater weight than that mentioned in test No. 2 is needed to start that key on its downward journey, and that the rate of descent at which it starts, will, if continued, produce no tone.

(4) That a still greater weight than that mentioned in test No. 3 is needed to make the same key descend at a speed quick enough to produce tone of even a *ppp.* quantity.

Let it be carefully noted that these four tests must be made with the same key.

A comparison of the different weights used in the four tests shows that the least of these weights is all that is necessary to merely hold a key down, and that the greatest is necessary to produce tone of even the smallest quantity.

The resistance-power of the key has, in the above instances, been tested by means of still weight, the amount of which can be exactly stated. But the weight used in piano-playing is almost invariably moving weight, conveyed to the keys by the player, in either rolling, swinging, or vibrating motions. And the resistance-power of even the heaviest keys is feeble when opposed to the weight that can be brought to bear on them by the player. In the following Section the employment of weight passing through a still hand and arm is discussed.

SECTION 4.

Mention has been made of the act of holding down a key after it has been depressed. This holding-act, which (if there be no staccato) follows immediately on the act of tone-production, is for the student generally a difficult one to learn. If the resistance of the piano-key were much greater than it

is, the correct application to it of arm-weight would be an easier task. This may be proved if a pedal of the piano be kept down by the hand. The necessity for a considerable degree of continuous pressure in order to prevent the pedal from forcing the hand up is so palpable that a correct calculation of how much pressure to use is easily made. Now, just as it would be a waste of energy to press on the pedal with more force than is necessary to prevent its resistance from pushing the hand up, so it is a waste of energy, while holding any key at low-level, to allow the balanced arm to add more pressure than will just overcome the delicate pushing-up power of the key. To add more than this is to overload that key.

The least weight — Sec. 3, Test 1 — that will keep down the top A of the piano after that key has been pushed down is about $1\frac{1}{4}$ oz.: the least weight — Sec. 3, Test 4 — that will produce a *ppp* tone when laid gently on the same key at high level is about 3 oz. If one proceeds from the top of the keyboard downwards testing the resistance-power of the keys, they will be found to gradually offer more and more resistance. Thus the A at the bottom of the keyboard after being pushed to low-level needs a weight of not less than $2\frac{3}{4}$ oz. to keep it there, and one of 7 oz. is required to produce a *ppp* tone from that key when laid gently on it at high-level. These experiments have been made with keys of the same piano. Of course the instruments of different makers show differences in this matter, as also do different instruments of the same maker.

From the fact that the weight of the balanced arm passing through the finger-tips can lean gently on the surface of the keys at high-level without depressing them, it is evident that, in order to hold down several keys, as: some pressure is needed extra to that

exerted by the arm and hand when merely resting on these keys at high-level. The total ounce-weight necessary to keep the above keys at low-level is different in each of the three cases. But, from the fact of this difference in the pushing-up (resistance) power of the keys themselves, the student must not conclude that it will be expected of him to consciously calculate h o w m u c h extra pressure is needed for each key that has to be kept depressed. The balancing or weighing faculty of the arm must be cultivated until its perception of the resistance of the key or keys becomes unerring. The calculation is then left to the subconscious arm.

In my book "Balance of Arm" I have tried to show the student how to cultivate the delicacy of muscular perception necessary for the correct holding-down of the keys. The student's tacitly expressed belief when he o v e r l o a d s the held-down key, that such treatment acts in some beneficial way on the already produced tone is well refuted by Matthay in connection with his simile of the see-saw when he says that "the energy at our disposal must be applied b e f o r e our "end of the lever reaches the ground, since all speed-making "is impossible after that moment." Let the student assure himself of the fact that the only m u s i c a l function possessed by the key when held at low-level after tone-production is that of preventing the stoppage of tone by arresting the return of the damper to the string. (The "damper" is the small piece of mechanism which stops the vibration of the string.) The key has also a controlling effect on the hammer, which will be afterwards referred to. (Sec. 9.)

SECTION 5.

I have as yet mentioned only the overloading of the key. But there is a possibility of making another miscalculation of its resistance-power, and of underestimating that, while holding

the key down: in other words, of putting too little weight on it. This fault occurs frequently when the arm and hand are being taught the rolling-motion. When the key is — so to speak — underloaded, it at once gives a visible indication of that condition. The held-down key is seen to move slightly and become restless under the finger — a proof that less weight is being put upon it than that mentioned in my first test (Sec. 3), namely, just sufficient to hold the key down, and prevent it from moving. When the held-down key becomes unsteady, it naturally is in the direction of a slight "rise" that the motion of the key is first noticed. The key's pushing-up power has for the moment asserted itself. It thus becomes evident that an insufficient amount of weight is being dealt out to the key. The equilibrium of the holding finger has been disturbed, and, consequently, the Balance is not properly adjusted to the resistance of that key. The key itself then becomes the self-registering index of the faulty condition of the arm.

SECTION 6.

For the cure of both faults — Overloading and Underloading the key — a series of "hold-exercises," without tone-production, must be practised.* These, in which the disjunction of the practice of "touch" from that of tone-production is effected, help to convince the student of several facts. They show him that the piano-key would almost seem to possess vitality; that it has a will of its own; and that it seizes the opportunity of shirking work when allowed to do so. They also show him that the tendency of the arm to lose correct balance during this toneless practice is the same as that often experienced by him while working at passages in which, with similar arm-and-wrist movements, tone-production is

*) See "BALANCE OF ARM": Bosworth & Co., London.

present. The mastery acquired in the former case will give him a quicker mastery in the latter. They also show him that the piano-keyboard may legitimately be used as a gymnastic apparatus pure and simple, without reference to its tone-producing powers.

SECTION 7.

Besides the key's passive function — its preventive action on the damper, as well as on the hammer a f t e r tone-production — there remains to be considered its active function: that of causing the Hammer to strike the String. Mention has been already made (Sec. 2) of the quick up-movement of the near end of the key when released suddenly from weight heavy enough to hold it down. This rate of ascent — its natural one — ought always to be allowed to the key in piano-playing. But its rate of descent must be made to vary as the amount of tone required varies. The slowest key-descent compatible with the production of any sound at all is that mentioned in the fourth weight-test (Sec. 3). It will be noticed that this slowest descent is nevertheless a r a p i d one. From this slowest (and yet rapid) descent necessary for *ppp* tone, key-descent proceeds, for an increasing degree of tone-power, through a series of increasingly quick degrees of speed up to those most rapid ones necessary for the production of *ff* and *fff* tone. An experiment made with the key will show that the amount of tone produced varies directly as the speed of key-descent varies. Let a series of finger-pushes be given to any key, with the lapse of a couple of seconds of time between each push. Begin with a s l o w push, and gradually increase the speed of each one. It will be found that as the push increases in speed the tone increases in volume: in other words, the loudest tone is produced in the shortest time.

SECTION 8.

But to obtain a clear conception of the chief duty of the key — its influence on the hammer — one must look inside the piano, and note the act performed by the hammer in tone-production. To anyone seeing this for the first time, the Rapidity of the blow will probably be unexpected. The hammer, while striking, both before and after the moment of its contact with the string, is visible only as a blurred outline. A close scrutiny will enable the observer to notice a faint "shadow" in the neighbourhood of the string at the instant of tone-production, provided the tone be p i a n i s s i m o. But if a loud tone — the consequence of a very rapid down-push — is produced, then the actual moment of impact is too short-lived to permit of visible proof. A t t h e s a m e i n s t a n t at which the ear hears the tone, the eye sees the hammer resting at a short distance from the string. The act of the hammer in tone-production is, in every case, momentary.

SECTION 9.

It was said in Sec. 4 that the only m u s i c a l duty discharged by the held-down key after tone-production is the prevention of tone-stoppage. But there is also a mechanical duty which it discharges, namely, that of preventing the hammer from falling back to the position it occupied before the key was depressed. After the hammer has delivered its blow on the string, it instantaneously falls back a short distance and remains there, fixed, at what may be called its "half-position," as long as the key is held at low-level. This arrest of the hammer in its fall-back from the string is the control mentioned at the end of Sec. 4. It is accomplished directly by the intricate inner mechanism lying between the key and the hammer, and only indirectly by the player. It is not possible for him, while putting or keeping a key down, to be muscularly

conscious of this special controlling power possessed by the key. And it is equally impossible for him, while h o l d i n g a key down, to be conscious, except by means of his sense of hearing, that the key is controlling the damper mechanism. What he has been made aware of by his examination of the hammer-blow is, that the act of tone-production is of the most MOMENTARY duration — that it is accomplished in the fraction of a second. This consideration is of the utmost importance in building up a technique adapted to the construction of the Piano.

CHAPTER III.

APPLICATION OF ENERGY TO THE KEYBOARD.

SECTION 10.

Seeing that Momentariness of tone-production has been demonstrated to be an inherent quality of the piano, it becomes the duty of the pianist to apply the energy at his disposal in a manner befitting this quality. His act at the instant of tone-production must also be momentary. That is: he must, for the production of tone of a certain quantity, depress the key at a certain speed, and then, instantaneously — at the same moment — if the key has to be kept down, apply to it the arm's balanced weight in just sufficient amount to prevent the key from moving (Sec. 4, 5); and the instant at which this physical change takes place is the tone-moment. The activity which produces tone gives place at this instant to the lesser activity — the minor passivity of Sec. 11 — which holds the key down and prevents the stoppage of tone. The degree of speed needed for the key-push is regulated by the volume of tone required, and the amount of weight necessary to prevent the key when kept at low-level, from moving, is calculated by the sensitiveness of the arm's balance. Now, just as the time spent by the hammer in executing its blow on the string has been proved to be, in the case of *ff*, invisibly short, so the time occupied by the brain-impulse in producing tone may for the pianist's purpose be considered to be inconceivably short. The

measurement of the duration of this Impulse lies within the province of the physiologist; but, for the correct application of the Impulse to the key, no physiological knowledge is required by the pianist.

SECTION 11.

For a clear comprehension of the diverse energies applicable to the piano-key, it may be well here to tabulate them.

ACTIVITIES.

(1) **Major**	(2) **Minor**	
The tone-producing Impulse.	(A) Rolling (B) Swinging (C) Vibrating	Arm motions.

PASSIVITIES.

(3) **Major** (Sec. 15)	(4) **Minor.**
Weight of arm balanced between shoulder and finger-tips; the latter resting on surface of keys at high-level. The feeling of Weight lies in the fingers.	Arm-Weight applied to the key while the latter is held at low-level.

Some explanation of the terms used in the above Table may perhaps help the student.

"Impulse" is to be understood as the Spark of energy sent through the arm which delivers to the key a push at a speed sufficient to produce tone. Any push given to the key which produces no tone, may, for the pianist's purpose, be considered as non-impulsive. Every impulse is to be thought of as more short-lived than the hammer-blow is rapid. Therefore, the inclination on the student's part to apply any

further impulsive force to the key after tone-production must be resisted (Sec. 4 and 8).

The ROLLING motion of the arm is a combined action of all its parts from shoulder to finger-tips, while the latter are on the keys. This combined action is seen focussed in curvilinear motions at the wrist, and these are dependent on the movements of the upper and lower arm, and the hand. The whole arm, by its continuous "flow," gives evidence of this combined action.

The SWINGING movement of the arm is a rise-and-fall from the shoulder. This arm-movement carries the hand from one part of the keyboard to another, along a curvilinear path in the air, after either a simple lift-up, or after an impulsive shove-off from the keyboard.

The VIBRATING motion of the arm is a rapid trembling quivering or shaking movement, possible only when the whole limb, from shoulder to finger-tips, is working under a fairly high state of muscular tension.

SECTION 12.

The above table is divided into two main portions: Activities and Passivities; and each of these again into Major and Minor. They are numbered for convenience of reference.

A table showing when they are employed in both teaching and playing is here given for the student's guidance. They are classified:

Firstly — Those which may be practised singly, and those which may be combined with others.

Secondly — Those which may be practised tonelessly, and those which include tone-production.

Thirdly — Those which may be practised apart from the keyboard, and those which need key-resistance to teach correct distribution of arm-weight.

The Singles are all toneless, and are practised both apart from and with the help of the keyboard.

The Combines are partly toneless, and partly tone-producing, and they all need the help of the keyboard.

TABLE.

PRACTICE without TONE.

Singles.

1) A of No. 2 without piano	5) B of No. 2 with piano
2) B of No. 2 „ „	6) C of No. 2 „ „
3) C of No. 2 „ „	7) No. 3 „ „
4) A of No. 2 with piano	8) No. 4 „ „

Combines.

9) A of No. 2 + No. 3
10) A of No. 2 + No. 4
11) B of No. 2 + No. 3
12) C of No. 2 + No. 3
13) C of No. 2 + No. 4
14) No. 3 + No. 4
15) A of No. 2 + C of No. 2 + 3
16) A of No. 2 + C of No. 2 + 4
17) A of No. 2 + C of No. 2 + 3 + 4

PRACTICE with TONE.

Combines.

18) No. 1 + B of No. 2
19) No. 1 + C of No. 2
20) No. 1 + No. 3 + No. 4
21) No. 1 + A of No. 2 + C of No. 2
22) No. 1 + A of No. 2 + 3
23) No. 1 + C of No. 2 + 3
24) No. 1 + A of No. 2 + 4

25) No. 1 + C of No. 2 + 4
26) No. 1 + A of No. 2 + 3 + 4
27) No. 1 + C of No. 2 + 3 + 4
28) No. 1 + A of No. 2 + C of No. 2 + 3
29) No. 1 + A of No. 2 + C of No. 2 + 4
30) No. 1 + A of No. 2 + C of No. 2 + 3 + 4

A short analysis of these is here given.

Nos. 1 & 2 May be practised with the finger-tips of the one hand on the palm of the other: or on a table.

No. 3 Is the same as is described in Ex. LI., Sec. 70, though without the keyboard; and in Ex. XCIV., Sec. 90.

No. 4 Is the same as No. 1 above, resting now the finger-tips on undepressed keys.

No. 5 Is the same as Ex. VI., Sec. 20.

No. 6 Is the same as Ex. LI., LII., and LIII.

No. 7 Finger-tips resting and leaning gently on undepressed keys.

No. 8 Exercise after key has been silently depressed with a finger of the other hand.

No. 9 Finger-tips on undepressed keys, arm rolling, though without causing keys to move.

No. 10 Same as No. 8 above, with the addition of arm-roll.

No. 11 Landing on keys after swing of the arm, though without depressing them.

No. 12 Same as Ex. LI., though done on surface of undepressed keys.

No. 13 Same as Ex. LI., though done with keys depressed by the other hand.

No. 14 Done with some of the fingers on undepressed keys, and some on silently depressed keys.

No. 15 Combination of elliptical (or circular) motion of wrist with arm-vibration, the fingers on undepressed keys.

No. 16 Combination of elliptical (or circular) motion of wrist with arm-vibration, the fingers on silently depressed keys.

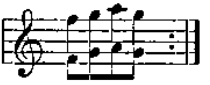
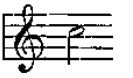
No. 17 Combination of elliptical (or circular) motion of wrist with arm-vibration, some fingers on undepressed and others of the same hand on depressed keys.

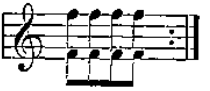
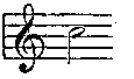
No. 18 Same as given in Ex. VI., Sec. 20.

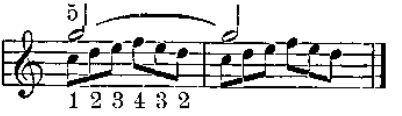
No. 19 Given in Ex. LII. and LIII.

No. 20 Is the simplest form of finger-exercise teaching independent finger-action with still arm: see Sec. 21.

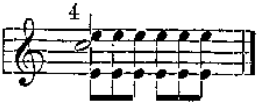
No. 21 Given in Ex. LXX. and LXXI.

No. 22  This exercise, in addition to touched (undepressed) by  2nd finger.

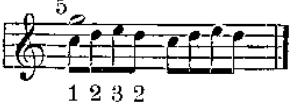
No. 23  This exercise, in addition to touched (undepressed) by  2nd finger.

No. 24 

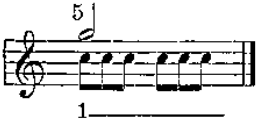
Gives sample of exercise.

No. 25 

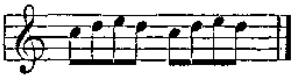
Gives sample of exercise.

No. 26 

This in addition to 4th finger resting on F undepressed.

No. 27 

In addition to 2nd, 3rd, and 4th fingers resting on D, E, and F, undepressed.

No. 28  Played to an "ordinary" ellipse (Sec. 36) with arm-vibration added, and with 4th and 5th fingers on undepressed keys: F and G.

No. 29 Example found in Chopin's Octave study in B minor, Op. 25.

No. 30 Same as No. 28 above, except that the 5th finger is kept depressed on G, while the 4th is undepressed on F.

CHAPTER IV.

PASSIVITY.

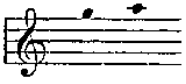
SECTION 13.

In Sec. 10, 11, and 12, use was made of the term Passivity. This state of the arm might, at first thought, be supposed to embody an absolute relaxing of all its energies — a state in which the muscular feeling is similar to that which it experiences when allowed to hang limp and motionless by the side. But in this latter wholly inert and uncontrolled condition it is muscularly incapable of overcoming effectively the resistance of the keys, and is therefore unfitted for piano-playing. A passivity l e s s than that of the hanging arm is the major-passivity mentioned in Sec. 11. This latter is the most passive condition of arm — or, in other words, the least active one — employed on the keyboard. It is used in teaching the student to get rid of superfluous muscular activity — to eliminate the Unnecessary, and give the Necessary a fair chance. If he succeed in accomplishing this, he will have acquired agility, ease, and a true piano-touch; see beginning of Sec. 21.

SECTION 14.

To make the student sure of the difference between the condition of the entirely passive arm and the condition of major-passivity, let him, while sitting at the piano, drop his arm by his side, and then give it, from the shoulder, a swinging impulse forwards. Let him then allow it to continue swinging backwards and forwards, in one piece, until it comes to rest. Then let him, while keeping the s h o u l d e r from rising,

slowly lift the whole arm, combining in this "lift" a gradual forward movement of the upper-arm with a gradual upward bending-at-the-elbow movement of the fore-arm. During these movements the hand and fingers remain entirely passive: that is, they, during the arm-rise, droop more and more at the wrist. Let the student continue this slow rise until the tips of the third and fourth fingers are hanging about an inch above key-level. (When they have reached this height the wrist itself will be about eight or nine inches above key-level.) After suspending the hand over the keys for a second or two — the fingers still drooping — let the student very gradually lower the arm until the tips of the third and fourth fingers just touch the surface of the keys without depressing them. Let him then stop movement and keep the hand suspended in



this pose at this height for a second or two, taking care while touching the two keys to put no weight on them. Let him then begin to lower the wrist gradually, at this same instant allowing the arm-weight to drop suddenly through the two touching finger-tips. If this dropping-down of the weight is done correctly, the two fingers will bend slightly. As the wrist continues to descend slowly, the thumb and the second and fifth finger-tips will come to rest on the surface of the keys, all five fingers now sharing the arm's weight. Immediately after the first, second, and fifth fingers have come to rest on their keys — the latter still undepressed — the wrist will reach a point at which the line of the back of the hand and that of the fore-arm make one straight line. Let the student here stop further downward movement. The wrist has now arrived at a "middle point" beyond which it would gradually descend if it were not prevented from doing so. And to cause it to remain at this middle-point it must be

gently held by will-power — something active. The motionless and apparently passive arm is thus active — in a sense. This mild activity gives to the whole limb a "tone" and balance, furnishing a basis from which to start the cultivation of tone-production. This is the state of major-passivity — mentioned in Sec. 13 — a state in which the arm is balanced between shoulder and finger tips, while the latter rest or lean gently on the surface of the keys at high-level. The feeling of Weight lies in the fingers.

SECTION 15.

In Sec. 4, 5, and 6, I have tried to make clear to the student what is meant by the condition of arm termed Minor-passive — that condition in which the arm remains while its weight is applied to a held-down key. In this minor-passive condition of arm there is more of the active element than there is in the major-passive, seeing that key-resistance is now met and has to be overcome. If the amount of that resistance be calculated exactly, there is, when the finger holds a key down, no visible expenditure of energy. And when the arm has undergone a thorough training in this matter, the player has very little muscular consciousness of the act of holding down a key or keys.

It may seem anomalous that a condition of arm which contains something active should be called passive. But this term has been given in order that the student may draw a distinction between those conditions in which action is muscularly invisible and those in which it is visible; and also that he may, by analysis, be able to discover the causes of faults in his technique, and cure these faults.

CHAPTER V.

OLD AND NEW METHODS. ARM MOVEMENTS.

SECTION 16.

A short survey may here be taken of some of the movements possible for the various portions of the arm: that is, of those movements which are required in Piano-playing. Some exercises will also be given for strengthening the muscles of the back, chest, and shoulders.

The modern study of the science of piano-teaching has brought into prominence the importance of the part which these powerful muscles play during any adequate performance of the works of the great masters. It is the duty of the "modern" student to train himself to be able to use, at any moment, any portion of his organism that can contribute towards the creation of that fusion of (1) his Conception of the composer's music with (2) the technical Expression of that conception necessary for reproductive art.

Between the rate of the development, during the previous century, of piano-playing or of piano-manufacture and that of the development of the art of piano-teaching, there exists a strange want of congruity. The appearance of Liszt and Chopin in the world of music early in the nineteenth century, and the revelation of the resources of the instrument which their compositions and their piano-playing brought about, led to a development of the science of piano-construction. Piano-making kept pace with music-making; and the further development

of the technique of writing for the piano, handed on through Schumann, Henselt, Brahms, Tausig, and Godowski, has been accompanied by a corresponding development of the piano itself, as exemplified in the makes of Broadwood, Erard, Bechstein, Steinway, Blüthner, etc.

But while the average technical skill of players has continued to increase, responding more and more to the demands laid upon it by the compositions of the great masters, the exact science of the application of the player's physical powers to the mechanism of the piano has not made a corresponding advance. At the time when composers' works were becoming more difficult to execute, and pianos were being made of larger size, more powerful in tone, and heavier in touch, teaching-science, for the conquering of mechanical difficulties, formulated technical methods which, insisting on the active finger-stroke and hand-stroke, endeavoured as much as possible by thus isolating the Hand from the upper portions of the arm to keep the latter fixed, thereby depending for the production of tone on the weaker muscles of the playing organism, instead of on the stronger. These restrictive measures were accompanied by a radical mistake in the application of energy to the Key, consequent on the persistent ignoring of its Lever-principle. The requirements of the piano-key were disregarded; and as a natural result it was subjected to an arbitrary and unscientific treatment which debarred it from correctly fulfilling the function for which it was designed.

SECTION 17.

By various pianistic law-givers it was decreed that the learner — for the purpose of acquiring muscular strength, agility, and "equality" of finger — should hit, beat, strike the key. And this grim treatment has been faithfully meted

out to it by thousands of piano-students during the past hundred years. But the key has been not the only sufferer. It has had its revenge in the many cases of sprained wrists and lamed arms with which it has been able to repay the student for some of the indignities heaped upon it.

And the stroke-treatment is not the only form of misuse to which the key has been subjected. It has suffered also from the exaggerated pressure (overloading) put upon it while lying at low-level after the finger-stroke. This species of treatment is referred to by Matthay in "The Act of Touch" while speaking of the piano-key as a "speed-tool." In a quaint metaphor he says, "We must not press that tool upon its bed" — that is, when it is at low-level — "since the key-beds are not like ripe fruit out of which sound-juice can be squeezed." Friedrich Wieck also, in his book "Piano and Singing," in warning the student against the same treatment of the key, says "Do not let yourselves be laughed at by every piano-maker's apprentice." From this remark it is to be presumed that in those days every apprentice knew more than some of the players about the nature of the piano-key, and also could appreciate the humour of the situation. Wieck's book was published as long ago as the year 1853, and was perhaps the first that was written having a strongly polemical character. From that time up to the present there have appeared many treatises dealing with the subject of piano-method; but it is only within the last two decades that the need of some reform in the teaching of piano-technique has been much discussed. This has been brought about chiefly in Germany, and through the publication there of a number of works written mostly by the pupils of the Berlin teacher Ludwig Deppe. The latter (1828—1890), a man of reforming tendencies, left little in writing to explain his ideas on the subject of piano-teaching. But a general estimate of these and of the

practical development arising from them may be gathered from the writings of his pupils, Clark-Steiniger, Fay, Caland, Klose, Söchting, and Bandmann. In connection with these works those of R. M. Breithaupt should also be carefully studied. The controversy going on at present concerning old and new methods is one of the results of Deppe's teaching.

SECTION 18.

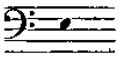
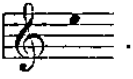
In order that the student may learn to use correctly all those movements necessary for a performance of the finest compositions in the most musical manner, it is not essential that he should be versed in physiological lore. At the same time, to obtain even an elementary knowledge of the peculiar structure of the arm and wrist — especially of the complex working of the fore-arm — will do him no harm, and ought to help him to take — for the sake of his art — full advantage of the liberal capacity for movement with which the body is endowed.

This knowledge may be had if the student will look into Huxley's "Lessons in Elementary Physiology," and study the chapter treating of "Motion and Locomotion." The practical application to piano-playing of the knowledge there obtained should lead to his giving free play to the fore-arm's power of supinating and pronating the hand. To quote from the chapter mentioned above: "If the elbow and fore-arm, as far as the wrist, are made to rest upon a table, and the elbow is kept firmly fixed, the hand can nevertheless be freely rotated so that either the palm, or the back, is turned directly upwards. When the palm is turned upwards, the attitude is called s u p i n a t i o n; when the back, p r o n a t i o n." (It will be noted that while the Supine position is that in which the left hand of the violinist is used, the Prone is that of the pianist.)

When the term "prone position" is used in connection with piano-playing, it is meant to express, in a broad sense, the fact that the palm of the hand faces downwards. It must, however, not be forgotten that this term implies neither such absolute nor such continuous parallelism between the palm of the hand and the plane surface of the keys as that implied in Huxley's illustration, where the palm is s t a t i o n a r y, and, presumably, f l a t. Many will recollect the era in the teaching of the piano to beginners when the Penny, placed on the back of the hand, played an important part as an indication of the hand's good behaviour — the fall of the penny, or even its unsteadiness, proving to the teacher's satisfaction that the pupil's manner of "holding the hand" was faulty. It would seem, therefore, that the penny's deportment was a matter of more consideration than the muscular Condition of the arm. In Sec. 21, par. 1, it is shown that stillness of hand and correct muscular condition may co-exist.

SECTION 19.

The greatest range of Rotary action of which the forearm is capable may be seen in the following exercises.

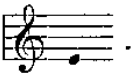
E x. I. Let the student make a "fist" with both hands — the fingers not too tightly doubled up — and then extend the index (2nd) finger of both. Place these fingers — held unbent — as far as nearly half their length on the two keys  and  . Keeping them on these two held-down keys, bring the elbows to the sides, and at the same time turn the hands round till the palms — partly hidden by the closed-in fingers — face upwards.

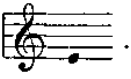
Reverse now the rotary action until the backs of the hands face each other, keeping the shoulders down, and at the same time extending the elbows out from the body. With the "flat"

of the fingers on the keys repeat this rotation many times for the sake of the valuable exercise of the fore-arm as well as of the shoulder and upper-arm muscles.

Lastly, perform this same rotary action resting now only the tips of the second fingers on the held-down keys, and holding the wrists high. In each rotation remember to bring the elbows close to the body.

Practise this exercise with each of the remaining pairs of similar fingers — both thirds, both fourths, etc. — holding down the same two keys.

Ex. II. Place the thumbs on the same two keys, hold these down and turn the fingers of both hands over the thumbs, trying to make the tips of the third fingers meet as nearly as possible over the note  . Turn the elbows out from the body while so doing.

Still holding down the thumbs, return to the first position, bring the elbows close to the body, and, taking the fingers off the keys, twist the fore-arms so that all four fingers pass under the held-down thumbs. Try to make the tips of the third fingers meet as nearly as possible in front of the note  . The palms of the hands are now facing upwards.

If these two exercises are practised carefully they will help the student to overcome the difficulties of the Loop, to be mentioned later on: See Chap. XII. He must work at them very gently, taking care, in his attempts at stretch, to regulate it according to the length of his fingers and the natural flexibility of his wrists.

These exercises show the two extremes of pose to which the peculiar structure of the fore-arm, helped also by the

rotation of the upper-arm, can carry the hand. But, in piano-playing, only a small fraction of this wide range is necessary. And the question of how much or how little rotary action ought to be used for each passage is an individual matter, to be settled by the player himself. The only general rule that can be given for his guidance is that the l e a s t amount of physical action that will produce the desired tone is the correct amount.

SECTION 20.

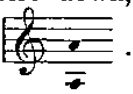
One or two exercises for strengthening the muscles of the upper portion of the body are here given.

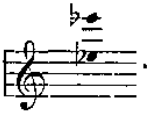
Ex. III. Stand erect, with the chest well out, and the head up. The arms hanging easily, place the open palms against the outer side of the thighs. Lift the shoulders straight up and down twenty or thirty times, keeping the elbow-joint and all the joints of the hands gently fixed: that is, without motion in themselves. Breathe naturally, keep the head still, and do not let the chest move from its "out" position. While practising this up-and-down shoulder movement (one of not more than two or three inches in range) do not let the body become rigid.

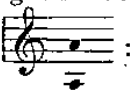
Ex. IV. Standing in the same attitude, try to bring both shoulders round to the front, that is, try to make them approach each other, and then carry them round to the back. Repeat this twenty or thirty times. Do not let the open palms leave the thighs, but allow them to be carried round a little to the front and then a little to the back along with the movement of the arms and shoulders. Keep the chest from falling "in," especially when both shoulders are being brought to the front. Breathe naturally, and do not hoist the shoulders.

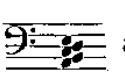
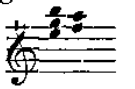
Ex. V. Lightly interlock the fingers of both hands in front of the body, the elbows touching the sides. Move the hands round from one side to the other, keeping the elbows and fore-arms constantly in contact with the body. During this movement to and fro, the body itself must not be allowed to oscillate nor rotate. If this exercise is done correctly, there will be a continual alteration of the angle made by the fore-arm and the upper-arm. Keep the chest out, the shoulders down, and the head up.

Ex. VI. The following exercise, done while sitting at the piano, is for the practice of arm-swing.

Pose the right hand for the octave stretch — that is, keeping the distance between the tip of the thumb and that of the fifth finger the same as lies between any two keys an octave apart on the piano. Bend the nail-phalanx of the thumb slightly inwards — that is, with the tip pointing towards the hand. Adjust the tension of the hand so that, during the arm-swing, the distance between the two finger-tips remains unaltered. This "fixation" must at the same time be preserved with the least possible muscular rigidity of hand. Play the top octave (A — A) of the keyboard, and, keeping the shoulders down, immediately swing the arm three octaves down to  . Swing immediately — without stop — back to the top octave, and repeat this swinging-action uninterruptedly till the shoulder muscles are slightly tired. This exercise may be done also tonelessly: that is, without depressing the piano keys — landing each time lightly on the surface of the ivory. While the arm is swinging in the air do not allow the hand itself to droop at the wrist. The path "in the air" described by the hand during the swing is that of a Curve. The highest point in this curve is reached when the hand is equidistant from the

limit-octaves, or just over the notes  . At this point the hand ought to be about 6 inches above the level of the keys. The action of the arm during the swing is not a shoulder-action alone: the elbow also participates. The fore- and upper-arm open out — unbend — as the hand approaches the outer extremities of the keyboard, and close in as it approaches the centre. For some remarks on the alteration of the angle at the outer edge of the wrist during the swing of the arm see Sec. 78.

A corresponding exercise for the left arm must be practised. The limit-octaves of the arm-swing will be the lowest A - A of the keyboard, and the notes  : a swing of three octaves. The conditions for the left-arm-swing are the same as those given above for the right arm.

Ex. VII. The following exercise is for strengthening the muscles of the chest, back, and upper-arm. Sitting at the piano, place the open palms on the keys  and  pressing the latter down tonelessly to low-level, and holding them there. The amount of pressure to be used in doing so is the lightest that will, with the arm balanced, hold the keys down: Sec. 3, Test 1. Count slowly 1, and, — 2, and — 3, and: giving the time of about a second to each complete beat. During the first beat, that is, from 1 to 2, increase and decrease the pressure on the held-down keys, returning to the original minimum of pressure at beat 2, and maintaining this least degree of pressure during beat 2 and 3. At beat 1 repeat the process. Care must be taken not to over-strain the arms and hands during the crescendo

of the pressure at beat 1. The force exerted must never become extreme.

A second form of this exercise may be got by placing the open palms — supinated — against the underneath side of the front part of the keyboard, just underneath these same previously mentioned keys. The pressure is exercised now in an upward direction, and under the same rhythmic conditions. Breathe regularly and naturally during these two forms of the exercise. The shoulders must not be allowed to rise.

CHAPTER VI.

ARM-ROLLING MOTION.

SECTION 21.

The major-activity, that is, the impulsive push necessary for tone-production, I have already tried to teach in connection with a still arm, and with inhibition of unnecessary movement in the hand*). In the same treatise, Chap. IX. and X., I have tried to teach the passivities — minor and major — in combination with curvilinear movements of the wrist and the rolling-motion of the whole arm: that is, with minor-activity. In the present work I go a step forward, and try to teach the rolling-motion of the arm in combination with the major-activity: namely, tone-production; in other words, a combination of the two activities. For many illuminative hints on this subject I have to thank R. M. Breithaupt's interesting book "Die natürliche Klaviertechnik".**) The piano student would do well to study this work carefully. For a physiologically reasoned advocacy of the arm-rolling motion, as well as for a powerful refutation of the "finger-stroke" and active-wrist method, let the student consult Dr. Steinhausen's "Klaviertechnik".***) In this valuable contribution — in which physiological science is brought to the aid of piano-teaching — the author shows

*) Balance of Arm. Bosworth & Co. London, 1903.

**) Breithaupt. Die natürliche Klaviertechnik, 2nd Edition. Kahnt. Leipzig, 1905.

***) Dr. F. A. Steinhausen. Über die physiologischen Fehler und die Umgestaltung der Klaviertechnik. Breitkopf & Härtel. Leipzig, 1905.

that it is a mistake to consider the various joints used in piano-playing — knuckles, wrist, etc. — as naturally stiff. He shows that they are not "born" so: indeed, that the opposite is the case; and that the student, in training himself, must not set out with the idea that he must "improve" his joints by making them loose and flexible, but rather with the idea that the special combination of muscles required for the execution of any passage must not be hampered in their work by the interference of unnecessary and disturbing muscle-action. To teach comparative Passivity is to teach this power of unconscious selection and rejection. (See end of Sec. 25.)

SECTION 22.

But before beginning the study of the arm-rolling-motion the student must thoroughly master the art of loading the key (Sec. 4, 5, and 6); otherwise, no progress can be made. If he is unable to calculate the amount of weight required for each key's resistance while practising with a still and balanced arm, the rolling-motion will disturb this calculation still more. And in any legato passage, to transfer a rolling weight correctly from finger to finger is impossible if the finger from which the transference is made is resting on its key either too heavily or too lightly, seeing that, in either case, the roll of the arm would be disturbed. Preparatory therefore to the practice of Rolling-motion plus Tone-production, the student must perfect himself in the toneless rolling indicated in Nos. 1, 4, 9, and 10 in the Table given in Sec. 12.

SECTION 23.

A short account of the Arm Rolling Motion and of the benefits — musical, mental, and physical — derivable from its adoption may be here given for deliberation by those players who have as yet not consciously used it.

1) The Rolling-motion of the arm is the combination of a selection from the range of movement possible for each of its separate portions — upper-arm, lower-arm, and hand. The chief visible result of the united action of these l o c a l movements is a continuous special delineation of curve-lines by the wrist. These originate partly from the rotary-action as well as from the gentle bending and unbending of the fore-arm, and partly from the rotary-action and the movement backwards, forwards, and sideways, of the upper-arm.

2) In the rolling-motion the unequal s t r e n g t h of the five fingers — an inequality i r r e m o v a b l e from them* — becomes of little moment, seeing that, if the form of the wrist's curve-line be correctly calculated, each finger will be brought over its key at the proper instant and at the angle most favourable for the transference of the necessary weight; Sec. 7. This correct distribution of weight at the correct moment is the so-called "equalising" of the fingers.

3) In the rolling-motion the unequal l e n g t h of the fingers facilitates Distribution of arm-weight through the wrist while the latter is travelling over its curve-courses. In passage-work, the arm, rolling the hand along the keyboard, carries the fingers from key to key, somewhat after the manner in which the spokes of a revolving wheel are brought successively to bear directly on the ground.**

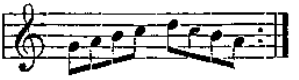
4) The rolling-motion does away with the isolated "lift-up" action of the fingers at the knuckles, and also with the "lift-back-from-the-wrist" action of the hand. It does not make the fingers look like claws, and the hands like flippers, seeing that it compels the greatest possible passivity of the muscles which induce these phenomena. "The rolling-motion

*) Steinhausen, Par. 56.
**) Steinhausen, Par. 75.

not only makes up for the want of any active raising of the fingers, but also presents unexpected and surprising advantages in the saving of labour. For the execution of a diatonic passage like the following 

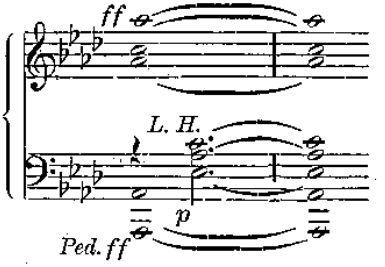
— that is, nine cases of tone-production — formerly 18 consciously acquired "art-movements" of the fingers were needed: a lift-up and a down-stroke for each finger. The same 9 notes may be played with two rolling-motions, one up and one down, making one elliptical figure described by the wrist. Thus, a great economy in mental and physical energy, and a still greater in time, is exercised, seeing that this natural movement needs no practice when once the player has become master of the art of weight-distribution."*

5) The rolling-motion is directly suited to the lever-nature of the piano-key. It does not treat the key as the piano-hammer does the wire, nor as a smith the iron on his anvil, nor as a clapper the bell, nor as a batsman the ball. It does not act on the key by means of a tap, a stroke, or a blow. It rolls weight on to the key, and pushes the latter down.

6) The rolling-motion, by substituting the Push, precludes the Stroke-action of the finger, and thereby furthers legato-playing. In a passage such as the following: 
the rolling-motion of the arm, by pushing the keys down instead of striking them down, alleviates, as much as possible, the percussion-nature of the piano's tone-production. It thus produces the finest legato possible from the piano. The percussion-nature of the hammer-action is the cause of the

*) Bandmann. "Die Gewichtstechnik des Klavierspiels." Leipzig, Breitkopf & Härtel. 1907.

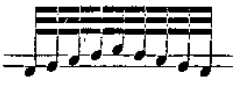
characteristic non-legato of the instrument. A proof of this non-enduring characteristic may be had if the following chords be played:



Let the first chord be played fortissimo, and the second (with the left hand) be played piano, at the rhythmic distance of one crotchet from the first chord. Try to make the tone produced by the second chord no louder than the remains of the tone heard from the first one. In the short space of time that has elapsed between the first and the second chord — namely, the time of the crotchet rest — it will be found that the tone remaining over from the first chord (sustained by the pedal) will probably be so soft as to compel the player to make the second chord pianissimo in order to fulfil the above condition. The illusory nature of the tone of the instrument is thus proved. If the first chord be played and the second omitted, the ear, while listening to the tone, imagines that it still hears a continued fortissimo. That this is a delusion, and that the ear only "remembers" the fortissimo tone, is proved by the difficulty the player has in producing, in the second chord, tone soft enough to do no more than equal that which remains over from the first. It is thus proved that the tone of any held note immediately after production is piano, even though that production has been fortissimo. And the amount of tone left over after a softly produced tone cannot be greater than that left over after one less softly produced. Therefore, it also must be piano.

These facts indicate the difference existing between the volume of tone of a note at its entry, and the volume of the same tone immediately after. In the musical example given above, when the second chord is unplayed there is time to listen to the remains of the tone of the first; and still, the likelihood of the ear being misled by the illusion previously mentioned is strong.

In any passage played legato, such as the following:



in which the succession of sounds is quick, the ear has no time to compare the small volume of tone left over at the end of one sound with the much larger volume heard at the entry of the following one. It is here a matter rather of comparing the beginnings of successive sounds, to decide whether these beginnings are equal with each other.

But legato is a matter of Quality also, as well as of equality. The term Legato, taken in its finest pianistic sense, means something more than merely "not staccato". It means the greatest possible freedom from percussion-quality of tone, whether the succession of sounds be quick or slow. It therefore also means, "not Non-Legato". And the rolling-motion of the arm confers this greatest possible freedom from percussion-quality, and thus helps to partly conceal the Piano's greatest defect, namely, the absence of a true Legato.

7) In "rolling" the finger on to any key from which tone is wanted, the weight, latent in the heart of the Roll, is released just at the moment that the finger, carried by the arm and hand, passes across that key. This releasing of weight — the dropping of weight down "into" the key — must not be allowed to disturb the rolling-motion of the arm as the latter continues on its way. The release of weight is a controlled release, seeing that the speed at which the key is depressed must be timed to produce exactly the amount of tone required

— a slower speed for a softer tone, and v i c e v e r s a; Sec. 7. The amount of tone required from any note depends on the latter's "musical" place in the phrase. This consists of one or more Note-patterns (Notenbilder*); and each of these, as pictured in the printed music, must have the outline of the wrist-curve fitted exactly to it. This fitting of the curve to the Note-pattern will be exemplified later on: (Sec. 30, and 44.)

8) The bodily advantage accruing to the player from a use of the rolling-motion is, that, with the least possible amount of energy expended, he gets the greatest amount of work done, seeing that, for his effects, he is able to depend more on the large and powerful muscles of the upper-arm, shoulder, and back, than on the weaker ones of the fore-arm and hand. By this it is not implied that he dispenses with the use of the latter. On the contrary: these smaller muscles are in constant use, and contribute unceasingly their proportion to the harmonious working of the whole arm. The rolling-motion allows the player to have an easy mind, and to feel confidence in himself during the heat of performance. The absence of physical obstruction in the arm and hand favours self-confidence; and the consciousness that, while playing, the commands of his will are obeyed, and his artistic personality is being mirrored in sound, reacts on the player and leads him to express himself unconstrainedly.

The part which the Rolling-motion plays in doing away with excessive and exaggerated stretch between the fingers will be demonstrated later on: Sec. 42, 44, and 46.

*) Bandmann. Gewichtstechnik: page 24.

CHAPTER VII.

CURVE-OUTLINES.

SECTION 24.

The figures outlined in space by the wrist during the arm's rolling-motion are the Ellipse, various modifications of the Figure-eight, and one of the halves, much reduced, of the latter figure, namely, the Loop. In actual piano-playing these wrist-curves are made while the finger, supporting the arm, is holding down a key. This complex action — the second of the Combines given in the Table, Sec. 12, a combination of Rolling-motion and Hold — should not be attempted before preliminary practice of its "separates" has been gone through. A study of Hold — the minor-passivity of the Table, Sec. 11 — I have already recommended: beginning of Sec. 21. And a study of the arm-rolling-motion may now be begun.

SECTION 25.

The first necessity for the student before he can execute any outline with precision, is to mentally see it: to imagine its form. If his mental picture of this be hazy, his bodily execution of it will be imperfect. And even though he may have a clear idea of the form of any outline, the muscular ability to trace that outline may be as yet uncultivated.

Ex. VIII. The simplest preliminary method, perhaps, of tracing any outline, is to do so near the wall. The neighbourhood of a "background" will help the eye. Let the student standing erect, with arm half outstretched and one

outstretched finger — the others lightly doubled up — trace figures of various shapes, circles, ellipses, figure-eights, spirals, etc., making the figures slowly, of various sizes, and of as perfect outline as possible. He must move his outstretched arm only at the shoulder and elbow, keeping the wrist and all the finger-joints braced: that is gently "fixed." These outlines must be executed first with each arm separately. Each figure ought to be outlined at a moderate speed, and until the muscles near the shoulder begin to feel slightly tired. The arm may then be rested by being allowed to hang limp by the side while the other arm is exercised. The shoulders, during the tracings, must not be allowed to rise.

Ex. IX. In the following figures the arrow-head is placed on the spot at which, and points in the direction in which, the tracing-movement starts. Trace slowly with each arm separately:

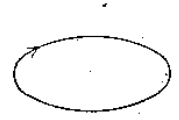


Fig.1.

Fig.2.

Fig.3.

Fig.4.

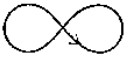


Fig.5

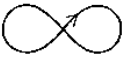


Fig.6

Fig.7

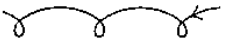


Fig.8

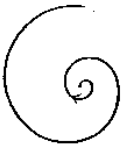


Fig.9

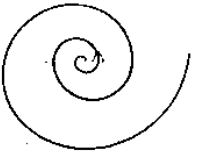


Fig.10

Fig.11

Fig.12

The benefit gained from a careful and symmetrical execution, with each arm separately, of these apparently simple

outlines is a muscular preventive one. This preliminary practice will render easier the Inhibition of the unnecessary disturbing involuntary movements certain to make their appearance when the student begins tracing outlines with both arms simultaneously. (See end of Sec. 21.)

SECTION 26.

Before beginning the practice of these figures with both arms simultaneously, a short description of the Convergent, Divergent, and Parallel motions of the arms may be useful. When the arms approach, from opposite sides, an imaginary line drawn from the head downwards through the centre of the body, the motion is Convergent. It remains convergent even though the arms (after meeting in the centre) cross each other*: since they, though now diverging at their lower extremities — the fingers — still continue at their upper extremities to approach this central line.

When the arms (hands) starting from the central line recede right and left from each other, the motion is Divergent. Even when the hands, starting from a "crossed" position, begin by approaching each other — both, at their lower extremities, moving towards the central line — the motion is Divergent, seeing that the upper extremities are receding from the central line. Both motions — convergent and divergent — are commonly known as Contrary-Motion. The motion is an easy one, because sympathetic to the body. An apparent discrepancy in the above definition arises from the fact that when the convergent arms cross each other the hands are then receding from the central line of the body.

When the arms simultaneously move in the same direction — both arms approaching or receding from the imaginary central line — the motion is then Parallel. This

*) Bandmann. Gewichtstechnik, page 99.

motion is more complex muscularly than contrary motion; it is more unsympathetic to the body, and consequently, more difficult to execute. While practising any figure in Parallel motion, the student should take special care to keep the hands always at the same distance from each other. This will exercise a controlling influence on the muscular system of the shoulder and back.

Ex. X. The following are the combinations (Contraries and Parallels) of the figures given in Sec. 25. They are to be worked with both arms simultaneously.

Fig.13

Fig.14

Fig.15

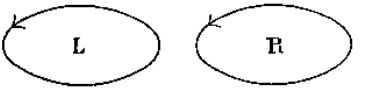


Fig.16

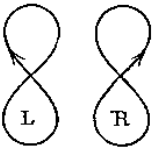


Fig.17

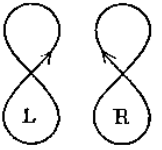


Fig.18

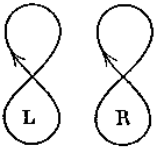


Fig.19

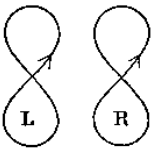


Fig.20

Fig.21

Fig.22

Fig.23

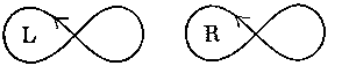


Fig.24

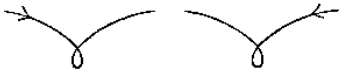


Fig.25

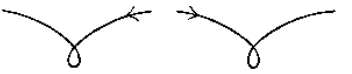


Fig.26

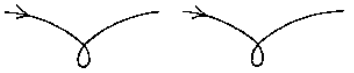


Fig. 27

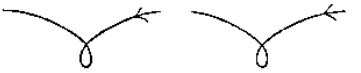


Fig. 28

If the student is anxious to discover how much (or how little) independence of arm-action he possesses, let him try to combine the left-portion of any of the figures with the right-portion of any of the other figures. For example: the left of either ellipse with the right of any of the Figure-eights, or Spirals; and vice versa. He will probably discover many unsuspected cases of uncontrolled and disturbing arm-action; and if these are worked at and mastered now, he will be in a better position for assimilating the complexities of the rolling-motion later on.

SECTION 27.

Ex. XI. A more difficult set of outlinings, derived from the Figure-eight, than those in Sec. 26, which were either Simple-contrary or Simple-parallel, are the following Compound ones: — contrary and parallel.

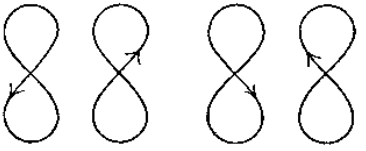


Fig. 29 Fig. 30

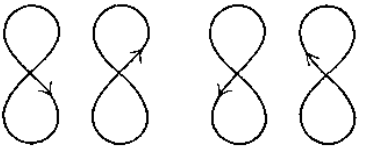


Fig. 31 Fig. 32

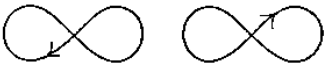


Fig. 33

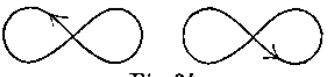


Fig. 34

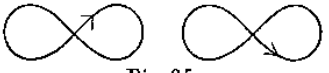


Fig. 35

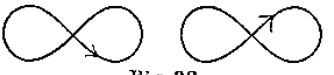


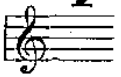
Fig. 36

It is hoped that the practice of outlining these various figures may have, in some measure, trained the student's mental eye to see any desired outline, and his physical powers to trace it correctly. The result of this twofold training he must now transfer to the keyboard, above and in front of which a series of delicate curvilinear wrist-movements is constantly taking place during the rolling-motion of the arm. In the previous free-arm exercises, there was one fixed point, namely, the shoulder. In the rolling-motion, as exemplified at the keyboard, there are two: the shoulder and the finger-tip. In the previous free-arm exercises, the wrist-joint was purposely kept still: during the keyboard arm-roll, it is in constant motion. In the previous exercises, the area within which the outlines were traced was limited by the length of the arm. During the rolling-motion at the keyboard, the area to which each wrist-curve or curvilinear figure is limited depends upon the dimension of the note-pattern to which it is fitted: Sec. 23, par. 7; and to some extent upon the length of the fingers.

CHAPTER VIII.

ROLLED WEIGHT.

SECTION 28.

Ex. XII. The student, before proceeding to the application of rolling-motion to tone-production, ought to make himself familiar with the figures in Sec. 26 and 27, when these are executed under the restriction of the limited area which a held-down finger compels. The drill for this consists in holding down with the third finger any key of the piano — preferably beginning with  for the right hand, and  for the left — and at the same time executing any figure given in the above-mentioned sections. The third finger has been chosen to begin with, as it will be found the most convenient so far as the loading of the key with correct weight is concerned. Each finger — of both hands — must be used in turn as the "holding" one. The first and fifth are the most troublesome — the fifth especially so when holding down "heavy" keys at the bass end of the keyboard. Before practising these exercises let the student give special attention to the remarks in Sec. 5, and 6, about "underloading" the held-down key. The hands must be drilled first separately, and then simultaneously. If this is thoroughly done now, the student will be spared much nerve-annoyance afterwards. As a test of this latter, let him, with the fifth-finger of both hands on held-down keys, practise any of the figures in Sec. 27. The disturbing muscular movements spoken of in Sec. 21, 25,

and 26, will show themselves persistently at first.. The best way of exorcising these unruly Spirits is the following. Let the student draw out on paper, on a fairly large scale, both the right and left-hand portion of the figure he wishes to master. Beginning the wrist-curve in each hand at the arrow-head, let him follow very slowly round the two outlines, watching both closely, and making his wrists follow slowly the course of the figures as followed by his eyes. Any mistake made by either of the wrists is a proof that the student is traversing the curvilinear pathway not slowly enough.

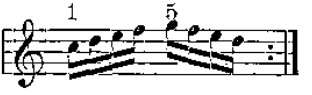
SECTION 29.

During the outlining of the figures given in Chapter VII. the movement of the wrist as a joint was suppressed — there was no independent wrist-movement. (See Sec. 25, Ex. VIII.) But in the arm-rolling motion productive of piano-tone, the wrist is in continuous undulating movement. The angle (1) made by the line along the fore-arm and the line along the back of the hand from the wrist to the knuckles is continually varying. The angle (2) made by the line along the outside of the fore-arm and the line along the side (the edge) of the palm from the wrist to the fifth-finger knuckle is continually varying. The line (3) across the back of the hand from second finger to fifth-finger knuckle and the line of the plane surface of the keys, are sometimes parallel to each other, and very often not — these last alterations of line-relation being occasioned by the continual delicate inter-change of pronation and supination of the hand: (see Sec. 18). These variations of angle and line-relation, taking place as they do in the easily seen lines of the arm and hand, take place therefore at the hidden centre of the wrist. And this focussed centre (Sec. 11) is itself in constant motion along paths similar to those outlined in Sec. 26 and 27.

Following out Steinhausen's comparison of the fingers (during arm-rolling-motion) to the spokes of a revolving wheel, this hidden centre of the wrist may be compared to the Hub of that wheel.

SECTION 30.

The student will now be ready to practise the combination of Tone-production, Rolling-motion, and Hold (the 24th of the Table in Sec. 12) — one in which the two Activities work along with the minor Passivity: Sec. 11. He will, for the first time, be asked to make the roll of the arm rhythmic. In doing so, he must learn to fit the wrist-curve line to the form of the Note-pattern: (Sec. 23). The period of time occupied in executing the whole curve is divided into certain portions, and each portion is separated from its two neighbouring ones by time-moments synchronous with the moments of Impulse which cause Tone. (Sec. 10.)

To give an example: Let the following ellipse be the form of the curve which the hidden centre of the wrist outlines "in the air" while the fingers of the right hand are playing this eight-note-figure: 

The time-distance between any two consecutive notes in this passage being the same (the eight notes of the passage being of equal time-value) and one steady complete revolution of the wrist-centre being needed for the eight notes, it follows that the whole elliptical line will be divided into eight equal parts. In other words, each piano-key must be passed over at an equal speed during the complete revolution, time and space being thus fitted to each other. The arm-weight is dropped "into" each key at equal time-distances, and the amount of tone

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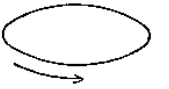
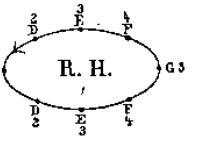
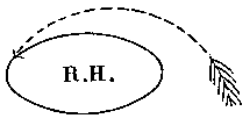


heard at each of the eight weight-drops must also be equal. Therefore, the speed of key-depression at each weight-drop must be equal. (See Sec. 7.)

SECTION 31.

A graphic representation of this eight-note passage as prepared for the student's practice is the following: The arrow-head shows the wrist's starting point as well as the direction in which the curve-line is to be followed. The equal distance between the letters prefigures the equal time-distance of the tones from each other; and the dots on the curvilinear line represent the time-moments at which tone-production takes place while the wrist-centre is travelling round. The arrow-head is placed before the C with which the passage begins. This signifies that the roll of the arm must begin before the first tone is heard. A preliminary curvilinear rise therefore of the arm, with the wrist gently braced, must be made to a height a little above the keyboard. From this height the arm without stop descends along a curvilinear path, getting thus a certain amount of "way" on before the surface of the keys is reached and the playing ellipse is begun. The curved dotted line in the following figure represents the upward and downward path of the arm and hand previous to the sounding of the first note of the passage: Sec. 36, Ex. XIII. The dotted line here shown proceeds graphically sideways — from right to left — in its rise and fall. It may and often does proceed forwards: that is, from the player forward to the keyboard. For a description of this rise and fall of the arm, see Bandmann: "Gewichtstechnik des Klavierspiels"; Breithaupt: "Die natürliche Klaviertechnik"; and my

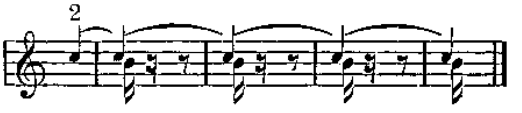




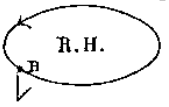
own book, "Balance of Arm." This important movement — the Swinging Motion of the Arm — B of the minor Activities, Sec. 11 — is indispensable in modern piano-playing, and ought to be taught from the first stages of instruction.

SECTION 32.

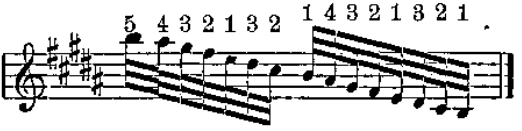
Just as, in learning Inhibition of unnecessary disturbing muscular action, the student begins tone-production with one finger only, so, in studying Rolling-motion combined with tone-production, he must begin with the depression of only one key during each complete Roll. On first attempting, during the roll, to allow the weight of his arm to drop through the finger "into" any special key without endangering the lineal perfection of the curve made by the wrist as its hidden centre approaches and passes over the spot on its curvilinear path-way "in the air," at which tone from that key has to be produced, the student will probably want to know what it is that he must do extra to the rolling-motion — which of itself will of course produce no tone, seeing that any roll may be correctly executed while the finger-tips are lying on the surface of undepressed keys. Even if it were possible for him to learn from some expert in the science of muscular mechanics the particular combination of muscles engaged in the movement, the information would probably be of such a nature as to puzzle rather than help him. The student knows that he cannot produce tone from the piano unless he push a key down at a certain speed: (Sec. 3). He knows that, in order to play the following passage:



with one complete elliptical arm-roll for each bar — graphically so:



he must do something more than merely allow the thumb once during each revolution to be pulled slidingly and diagonally across the surface of the key B without depressing it. This "something more" is the telegraphing of the Impulse (Sec. 10) through arm, hand, and finger with the speed of thought, effecting thereby a momentary muscular contraction, acting independently on the thumb and producing tone by pushing its key down. Simultaneously with this thumb-activity, the third, fourth, and fifth fingers remain passive: (Sec. 9 and 10). This muscular momentary contraction is immediately followed by Muscular Relaxation, even if the thumb be held down. The student will recollect that the duration of the hammer's act on the wire was seen to be momentary: (Sec. 10). The duration of this muscular contraction is momentary, and the duration of a nerve-flash down through arm, hand, and finger is shorter than the duration of the hammer's blow on the wire. A passage therefore of the following nature:

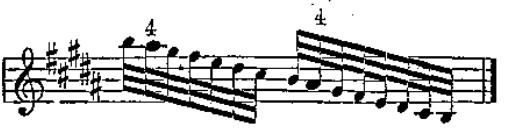


is played by a series of nerve-flashes, each two contiguous ones being separated by an infinitesimally short period of muscular relaxation. The above scale consisting of fifteen notes, there will thus be fourteen intermediate periods of relaxation experienced during the playing of the scale — one between each pair of contiguous notes.

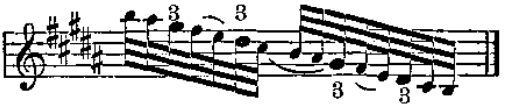
SECTION 33.

A further analysis of the scale given in the last section will show that the fifth-finger has been stimulated only once. It will therefore remain passive during the rest of the scale.

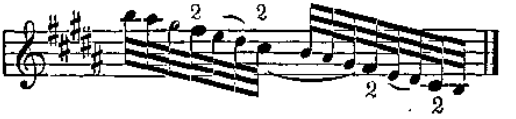
The fourth-finger has been stimulated twice; and between these two there is an interval of time filled in with six stimulations of other fingers.



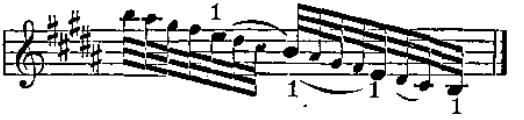
The third-finger has been stimulated four times; and between each of these there are intervals of time filled in with two and three stimulations of other fingers:



The second-finger has been stimulated four times; and between each there are intervals of time filled in with two and three stimulations of other fingers:



The first-finger has been stimulated four times; and between each there are intervals of time filled in with two and three stimulations of other fingers:

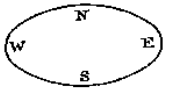


The intervals of relaxation occurring between the moments at which the same finger pushes down its key are intervals of Passivity for that particular finger. As was seen above, the fourth-finger enjoys the longest respite, there being six intervening moments of stimulation given to other fingers before its turn comes round again. From these considerations

it will be evident that, during the playing of the scale, the hand, if it has been properly trained, has as many passive moments as it has active ones. This interchange, at a very rapid rate, of activity and comparative passivity during the rolling-motion of the arm, gives to the whole limb the feeling of working almost unconsciously. The adaptation of the rolling-motion to the playing of scales and arpeggios will be shown later on: Chap. XIII. and XIV.

SECTION 34.

At the beginning of Sec. 25, mention was made of the necessity for a lineal perfection of the wrist's curve, implying thus that any imperfection in that line would spoil the arm's chance of dropping weight "into" the key correctly. It may perhaps help the student to acquire this perfection of curve-outline if he will accustom himself to think of four points in the circumference of any ellipse, as North, South, East, and West.



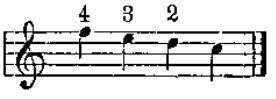
This division of the whole line into sections will help him to locate the quarter in which any line-imperfection — and therefore tone-imperfection — may show itself, and thus to fasten on the weak spot and strengthen it by slower and more careful practice. It will be found that irregularity of outline is likely to occur more frequently at the sharper portions of the circumference — namely, E. and W. — than at the flatter portions. As a test of the steadiness of the wrist's curvilinear movement and a guide to its truth of outline, let the student, while practising with separate hands, enclose the "working" wrist between the separated index and middle finger of the other hand opened scissor-wise. These two enclosing fingers must neither push nor pull the "working" wrist, but must lie lightly on it and accompany it round. Any irregularity in the "working" wrist will be at once felt by the other hand.

SECTION 35.

It is necessary to warn the student who may be trying to acquire the rolling-motion — particularly if he happen to be encouraged to do so from merely r e a d i n g any treatise on the subject, and without the practical guidance of any one who consciously uses it — that his first attempts will be hampered by the presence of two stumbling-blocks.

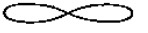
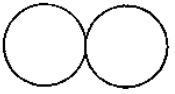
The first of these is the feeling that, while rolling the arm, he cannot, as he expresses it, "get any tone"; that his touch is insecure: that he tumbles off the keys — especially if they are black keys. The cause of this is: Want of sufficient preliminary training in the art of Balancing the Arm while holding down a key or keys. This feeling of insecurity, with its practical consequence of "want of tone," will never be got rid of until the student has learned how to load the key with that amount of weight which will allow his hand and arm to be pulled about hither and thither without fear of the finger-tip's being dislodged in the process. The art of doing this is indispensable in scale and arpeggio work, in which is used the "loop" seen in Fig. 7 and 8 of Sec. 25. See Chap. XII.

The cause of this particular stumbling-block is Insufficiency of Weight on the held-down key. This underloading of the key (see Sec. 5) is specially fatal in legato-playing, when arm-weight is being transferred from finger to finger — in other words, from key to key. In such a passage as the following:



if the student applies the correct amount of weight to the fourth-finger after having sounded F, he then feels assured that he will be able to transfer weight to the next key — E — with the exact speed of down-push that will produce tone of the necessary quantity. But if, to that same key — F — held by the fourth-finger, t o o l i t t l e weight be applied, then the student's arm is out of Balance, and has lost the "purchase"

or leverage necessary to enable it to roll weight on to the next key — E — with the necessary speed of down-push, and at the exact instant. The act of crossing a brook on stepping-stones gives an illustration of the transference of moving-weight. If the weight of the body in its transference from foot to foot — this is, from stone to stone — be unbalanced, the security of the crossing is endangered; and for the correct transference of the weight to any stone, the previous stone must, up to the last moment, be correctly loaded with the weight that is just about to leave it.

The student's second stumbling-block is the temptation, at first, to make all his figures — Ellipses, Figure-eights, Loops, etc. — too extended, too large. He is tempted to squander energy in making his wrist-curve-lines exaggeratedly spherical. If he have this figure  to trace, he will make it like this:  ; or he will make  like  . While the previous mistake was disastrous, this one is wasteful and absurd. Such exaggeration is the result of either faulty and insufficient preliminary practice of these outlines, or of the natural tendency of every novice when learning any movement to start from the maximum. If, during his increasing familiarity with the intricacies of the rolling-motion, the student will try to remember that the finger, hitherto free, has now, in these applied forms, become a held-centre round which these curvilinear figures are constructed, or a pivot on which the hand turns, he will quickly learn to limit their extension to the exigencies of the keyboard, and to make each figure, when fitted to its note-pattern, as small instead of as large as possible.

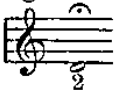
CHAPTER IX.

APPLICATION OF ROLLED WEIGHT. THE "ORDINARY" ELLIPSE DIVIDED EQUALLY.

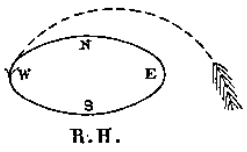
SECTION 36.

The student may now begin Exercises for the application of weight to the keys — that is, for tone-production — while the arm is in continuous rolling-motion. Every arm-motion must be a motion of the whole arm — not merely a fore-arm motion, or a hand-motion, but one in which all the separate portions of the limb from finger-tip to shoulder are conjointly engaged. It will conduce to the carrying out of this important principle if he will think of the muscles of the back, chest, and shoulder as the source of his arm-movements. As to the particular muscles which are used while making these movements, he may safely leave that to the physiologist. What the student must see to is: that every joint of the limb — shoulder-joint, elbow-joint, and wrist-joint, — be in some degree, either greater or less, kept in continuous motion.

THE "ORDINARY" ELLIPSE.

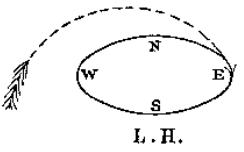
Ex. XIII. Let the student, sitting at the piano, the right hand resting on the knee, make a curvilinear rise and fall of the right arm as shown in Sec. 31 and drop the second-finger on D,  , continuing the curve-line now as an elliptical figure described "in the air" by the wrist-centre, while

holding the finger continuously on D at low-level. Proceed with the wrist-curve in the direction in which the arrow-head points: that is, South and then East: see Sec. 31. With the second-finger holding down D, execute twenty or thirty of these elliptical figures, making each complete ellipse in the time of one second. This gives a fairly quick roll to the wrist. No attempt must be made to originate arm-motion from the elbow alone: the upper-arm must participate. Keep the hand loose, and do nothing active with the third, fourth, and fifth-fingers, but let them rest easily on the surface of the keys at high-level. The thumb — that is, the first-finger — will be pulled slidingly away from and replaced on the keys at each revolution. Do not allow the wrist to rise too high or fall too low, thus perpetrating the exaggeration spoken of in Sec. 35. Try to retain in the mind a vivid picture of the exact form of the ellipse, and continually scrutinise the wrist-curve-line to see that it reproduces this mental picture as closely as possible. During the wrist's curve-motion there will be noticed in continuous free "play" the alterations of angle mentioned in Sec. 29. Of these, the third — namely, that caused by the rotary action of the fore-arm — need not be specially attended to, seeing that if the wrist be free the hand will pronate and supinate naturally, and just as much as is necessary.



R.H.

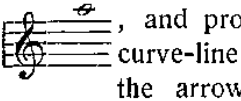
For the left hand, use the same note, D, holding it down with the second-finger, after executing the wrist-curve as shown in the following diagram: proceeding first South, and then West.

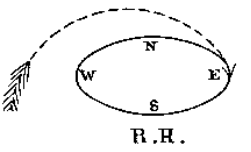


L.H.

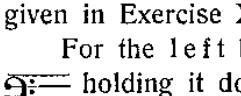
THE "REVERSED" ELLIPSE.

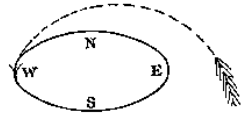
Ex. XIV. This is the converse of the previous exercise. Let the student, with the right hand resting on the knee, and the

wrist slightly braced, make a curvilinear rise and fall of the right arm, as shown in the following diagram: landing with the second-finger on the key A  , and proceeding with the wrist-curve-line in the direction in which the arrow-head points, that is, South and then West. Make twenty or thirty repetitions of the elliptical figure in this direction — the opposite of that given in Exercise XIII.



R.H.

For the left hand, use the note A three octaves lower  holding it down with the second-finger, and executing the wrist-curve-line as shown in the following diagram: proceeding first South and then East.

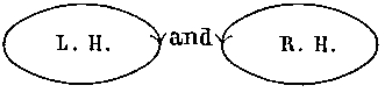


L.H.

The Roll shown in this exercise is made use of in scale and arpeggio work. See the "reversed" ellipse, Sec. 52.

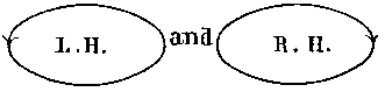
When the student is able to make the wrist-curve-lines perfect in shape, and, at the same time, to keep the "held-down" key from showing any sign of unsteadiness, he must then, in a similar manner, exercise each of the remaining four fingers of both hands. In drilling the fifth-finger he must take care that its knuckle is not allowed to fall inwards — that is, in the direction of the keyboard: see Ex. XLVII, Sec. 65. Neither must he allow its nail-joint to bend inwards: that is, with the tip pointing away from the hand. If these tendencies are overcome now, he will have less trouble later in building up his hand to the muscular tension necessary for rapid octave-playing: see Chap. XV. For this same purpose the nail-joint of the thumb should be kept bent slightly outwards — that is, with the outside angle of the nail-joint pointing in the direction away from the second-finger.

Ex. XV. (A) The student must now work both hands simultaneously; firstly, in contrary motion. Let him combine the

figures given in Ex. XIII, namely, 

using in both hands the second-finger to begin with, and then proceeding to each of the other four pairs of fingers in turn, using the same finger in both hands.

(B) The "reversed" contrary-motion, namely,



must then be practised, and with the same method of combining the pairs of fingers.

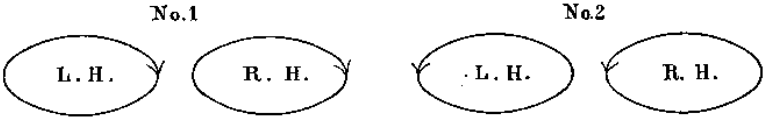
Ex. XVI. The student may then practise first A and then B of the previous exercise, combining now a dissimilar pair of fingers. Each finger of either hand must be combined with every finger in turn of the other hand. If this is done with the curve-directions given at both A and B, the student will have fifty different pivoting experiences.

The following Table gives the possible finger-combinations; in all, 25:

L. H.		R. H.
1	with	1
1	„	2
1	„	3
1	„	4
1	„	5
2	„	1
2	„	2
2	„	3
2	„	4
2	„	5
3	„	1
3	„	2
3	„	3
3	„	4
3	„	5

L. H.		R. H.
4	with	1
4	„	2
4	„	3
4	„	4
4	„	5
5	„	1
5	„	2
5	„	3
5	„	4
5	„	5

Ex. XVII. The student may now begin these wrist-curves in Parallel Motion. Let him practise the twenty-five combinations of fingers given in the preceding exercise, using the following curve-directions:

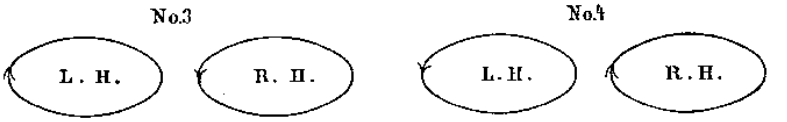


It is hoped that the student will continue the practice of this exercise until he has acquired a perfect parallelism between the motions of the arms.

Ex. XVIII. This having been acquired, he may then go on to Compound-contrary and Compound-parallel motion as applied to the ellipse. The compound nature of the movement is produced when the lower-curve of the ellipse in the one hand is made simultaneously with the upper-curve in the other hand. The four possible variants of Figs. 1 and 2 of the previous exercise are the following. The movement must start at the arrow-head.

COMPOUND-CONTRARY.

COMPOUND-PARALLEL.



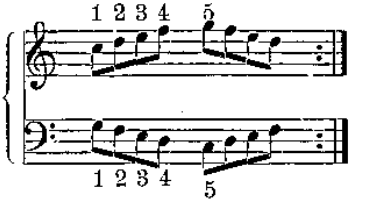
The student must practise each of these four figures with the twenty-five finger-combinations given in Ex. XVI. of this section.

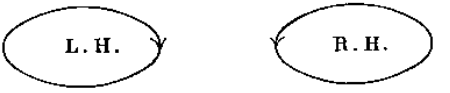
SECTION 37.

THE "ORDINARY" ELLIPSE DIVIDED EQUALLY.

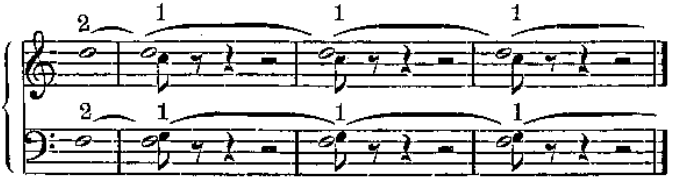
In the exercises of Sec. 36 the student has been working at a combination of A of the Minor Activities with the Minor Passivity; see Sec. 12. He will be prepared now to practise the combination of the same two with the addition of the Major Activity, namely, tone-production — No. 24 of the Table given in Sec. 12.

Ex. XIX. 1. An attempt will here be made to teach, in Divisions, the following note-pattern as played with an equally divided elliptic arm-roll. The five different notes of which the Figure consists, C, D, E, F, and G, will, in pairs — one note in each hand — be used as "held" notes — a different pair for each Division. The particular Roll to be used in the Figure is that given at A of Ex. XV., Sec. 36, namely, the "ordinary" ellipse:



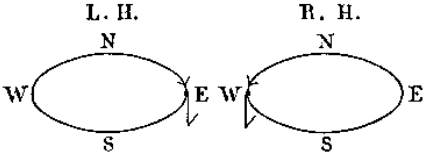


The notation of the first portion of the practice is:



The following Directions are given in order to make clear to the student what he must do while practising this first portion of the first Division of the Note-pattern.

1. The second-fingers must hold down D and F continuously.
2. Eight equal beats must be counted during each complete ellipse, and the whole curvilinear line be divided into eight equal lengths, one for each beat, eight for each bar.
3. At beat 1, the thumbs must sound their notes C and G.
4. At beat 2, the thumbs must be drawn slidingly off their keys by the Rolling of the arm, and must then do nothing until beat 1 comes round again in the following ellipse.
5. Each ellipse must be made more slowly than it was in Ex. XIII. of Sec. 36, — allowing now a couple of seconds to each one.
6. The particular "spot" on the elliptic path at which the notes (C and G) are to be sounded by the thumbs is graphically so:



at East for the left-hand, and at West for the right.

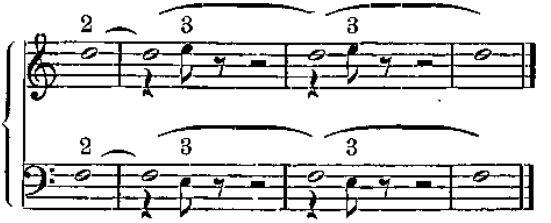
7. Both hands must work simultaneously in Contrary-motion, and must repeat the ellipse until it goes well.

Let the student re-read Sec. 32.

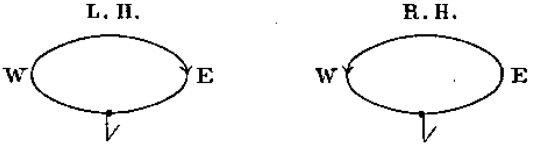
To complete this Division — the two second-fingers being still used as held notes — each of the other fingers, namely, third, fourth, and fifth, must in turn have its practice of sounding the note belonging to it. Seeing that in the whole note-pattern

one ellipse is executed, that e i g h t equal beats have to be counted, that each beat has a sounding note belonging to it, and that there are only f i v e notes in the pattern, it follows that some of these five must be repeated. The repeated notes are D, E, and F. When any one of these three is used as the held note, the whole Division has six portions. But when either C or G is used as the held note, the whole Division has seven portions — the D, E and F occurring then in the upper as well as in the lower-curve of the ellipse. When either C or G is held, D in the right-hand and F in the left are second beat in the lower-curve and eighth in the upper: E, in both hands, is third in the lower and seventh in the upper: F in the right-hand and D in the left are fourth in the lower and sixth in the upper-curve. All this will become more evident to the student when he proceeds to the remaining five portions of the present Division: see Sec. 38.

2. In the s e c o n d p o r t i o n of this same Division the held keys are still D and F, and the playing conditions are the same as those of the previous portion, except that the playing finger now is the third — note E — for both hands, at beat t h r e e. The notation therefore is:

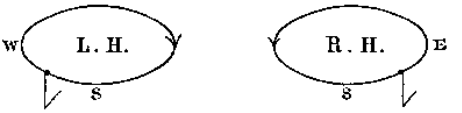


and the graphic representation:



Seeing that the third quaver of the note-pattern is E, and that the second quaver has the held keys D and F, the third-fingers will sound E at beat three, and be drawn away from the keys at beat four. The particular spot in the lower-curve at which E is sounded is now at its lowest point, namely, at South.

3. In the third portion the held keys are still D and F, remaining so during the remaining portions of this Division; but the playing fingers are now the fourths, for F in the right-hand and D in the left, sounding the notes at beat four. The graphic representation is therefore:

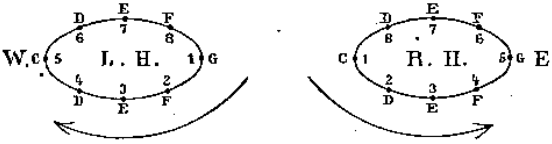


that is, half way between South and West for the left-hand, and half way between South and East for the right. The regular counting of the eight beats must still be continued.

4. In the fourth portion — the held keys remaining the same — the playing fingers are the fifths, and the beat at which they sound their notes — G for the right-hand and C for the left — is beat five. The graphic representation is:

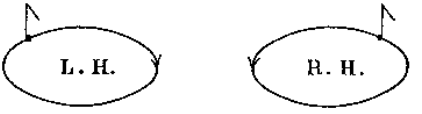
namely, at West for the left-hand, and East for the right. The student will have noticed that, in the graphic representation in each portion, the location of the note on the periphery of the ellipse has changed. Also that, with the exception of the cases in which the points East and West have been occupied, it has hitherto been the lower-curve of the ellipse on which the note was placed. In the concluding two portions

of this Division the note will be found on the upper-curve; and, as was before mentioned, F in the right-hand and D in the left which have already appeared as beat four will now be six, and E in both hands which previously was beat three will now be seven. A graphic representation of the whole note-pattern will perhaps make this more clearly understood:



In entering on the upper-curve of the ellipse from East in the right-hand and from West in the left, the line along the outer side of the arm and that along the outer edge of the palm of the hand become for the moment a nearly straight one. At this moment he must not "pronate" or "supinate" the hand much: see Sec. 18.

5. In the fifth portion — the held keys being D and F — the location of the sounded notes, namely, F for the right-hand and D for the left — both played with the fourth fingers at beat six — will be graphically:



6. In the sixth and concluding portion — the held keys being D and F — the location of the sounded note, namely, E, for both hands — played in both at beat seven with the third-fingers — will be graphically:

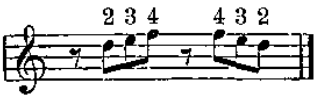
It is hoped that in these six portions the student has tried to make the wrist-motion perfectly regular, that is, to make it travel along in a perfect curve, without the slightest jerk in the arm, and with an equal pace for each of the eight beats — 8 sections — into which the time spent in traversing the line is divided. To obtain now a mastery over this regulating of the form and the pace is to obtain a future mastery over what is commonly known as the "equalising" of the strength of the fingers: (see No. 2 of Sec. 23). The hand-tension necessary for furthering this equalisation will be spoken of later on — Chap. XV.

Before passing on to the second Division of the original note-pattern, namely that in which each of the six portions is worked at while the note E — third-finger of both hands — is used as the "held" note, the student's attention is called to a remark made in the 4th of the directions given at the beginning of Ex. XIX. It was there said that the thumb must be "drawn slidingly back from" its key by the rolling-motion of the arm. The term "drawn back from" is to be understood as including two distinct acts: firstly, a gentle sliding towards the edge of its key by the thumb while the key is still at low level; and secondly, the letting up of that finger just when the next finger goes down. The first of these — the sliding motion — is necessary to prevent any stoppage of the movement of the wrist's centre along the path of the ellipse. The second is, the relaxing, at a certain moment, of the gentle pressure which the finger exerts on the key while holding it down. This moment is that at which the next beat arrives. And this beat arrives when a certain section of the curve of the ellipse has been traversed. In legato-playing this is the moment at which the new note arrives and the old one departs. The relaxing of this gentle pressure at the departure of the old

note is to be regarded as an act of the greatest possible Passivity. The movement is merely an up-movement of the finger in close contact with the key. The thumb-slide takes place during the "ordinary" ellipse only: see Ex. XIII, Sec. 36. See also the end of Ex. XXXIV, Sec. 52.

SECTION 38.

In the Division just concluded the student will have observed that the second-fingers have been used as the "held" fingers throughout each of the six portions. In each of the remaining four Divisions now to be practised, a pair of similar fingers (that is, both thirds, both fourths, etc.) will be used as the held pair, and the same pair will run through all the portions of the same Division. In the Division in which the thumbs are held, as also in that in which the fifths are held, there will be seven portions; for the reason that, in each of these Divisions, the three twice-used fingers of the note-pattern



viz. the second, third, and fourth, are then free. When the thumb is the held finger it may be allowed to slide backwards and forwards on its key. If the student has thoroughly understood and worked carefully through the six portions of Division I. detailed in Sec. 37, he will understand how to go through the remaining four Divisions. Let him not grudge the time spent on this preliminary practice of the Rolling-motion.

The following Table gives the "held" fingering belonging to each of the five Divisions of Ex. XIX.

In	Division	I.	the	2nd	fingers	are	held
„	„	II.	„	3rd	„	„	„
„	„	III.	„	4th	„	„	„
„	„	IV.	„	5th	„	„	„
„	„	V.	„	1st	„	„	„

The thumb and the fifth-finger have been left till the last, as it is on these two outside fingers that it is most difficult to balance the arm correctly.

SECTION 39.

The student will now begin using the rolling-motion as applied to the simultaneous production and stoppage of tone commonly called Legato-playing. During the preliminary practice of this "binding" of two sounds, a "held" finger will still be used as a pivot for the arm and hand to turn on.

Among those writers who advocate the introduction into piano-teaching of the Rolling-arm-motion, there are some who would set aside as useless, harmful, and retrograde, all exercises which include any "held" finger. Such exercises' are certainly useless to the student if they teach him nothing. But if, on the contrary, they teach him to load a key or keys with weight correctly (Sec. 4) while playing simultaneously with other fingers of the same hand, then they are teaching the art of d i s t r i b u t i n g w e i g h t to the keys, which is one of the chief aims of the rolling-motion.

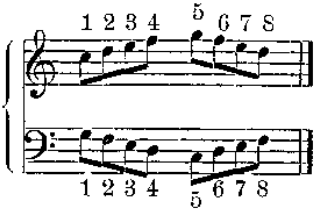
Exercises which make use of these "chained-up" fingers — as they are opprobiously termed — are certainly harmful if they teach the student to o v e r l o a d the key and consequently to induce unnecessary tension and false muscular conditions in the hand and arm. But it is by means of the "held" finger — the tenuto — that the student can be most effectually taught how n o t to overload, as well as how not to underload the key: (See Sec. 5 and 6). To call the study of this special branch of piano-technique harmful would seem then to be only one degree less strange than to say that the compositions of J. S. Bach are the most dangerous that can be recommended to the student, seeing that they, much more than those of any other composer, compel the use of the

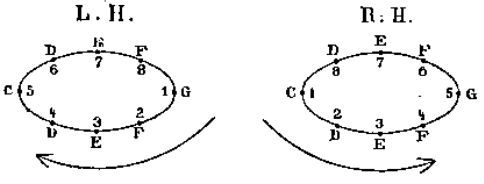
"chained-up" finger. To hold down a key with the correct amount of weight — and the rolling-motion will test this — can never do harm to the finger.

To stigmatize these exercises as retrograde would be just only if it could be proved that they act unfavourably on the student's technique or debase his musical taste. The raising of the art of piano-teaching to a higher general plane than it occupies at present will to a considerable extent depend on the amount of attention paid to the lever-nature of the key, and on the inculcation of a certain muscular Passivity in the student's playing organism. And in the study of both of these matters the "held" finger, with the help of the rolling-motion, will play an important part.

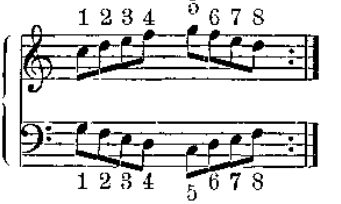
SECTION 40.

The student may now begin the practice of the rolling-motion applied to the production of tones played legato. Small portions of the old Note-pattern, viz: will be used to begin with. The notes of the pattern are here numbered according to the order in which each one appears while the ellipse is traversed. The figuring therefore in the exercises given below is to be considered not as indicating the fingering, but as showing particular spots on the curve-line at which, when the wrist-centre is passing over these, the notes are to be sounded. The following diagrams will perhaps make this clearer. See Sec. 37, Ex. XIX, No. 4.

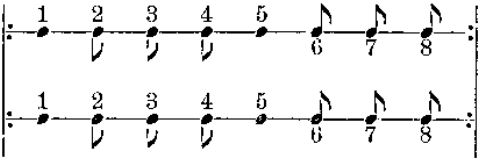




The exercises following will be given in "compressed score" in order to save space. It will be noticed that in both of the above diagrams the numbers 2, 3, and 4 are on the lower-curve, and that 6, 7, and 8 are on the upper-curve of the ellipse. To keep the student in mind of this the stems of the notes will be turned up or down according as they belong to the upper or lower-curve. The notes C and G being on the "outsides" of the curve are given without stems. The whole note-pattern



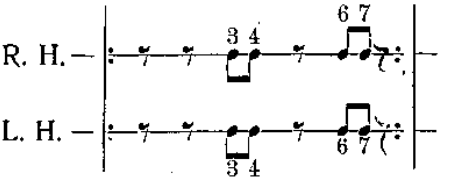
written in compressed score will accordingly appear so:



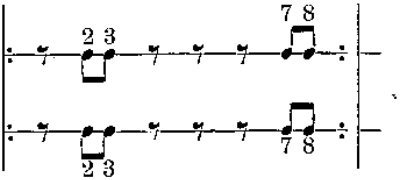
The finger to be "held" throughout the exercise will be indicated, though not in the notation; and in order that the rhythm may be kept strictly, the full complement of rests will be given. The direction in which the line of the wrist-curve starts is shown in the above elliptical diagrams. The actual notes used by both hands are those given in the above note-pattern. Each of the exercises following represents one complete bar; and the lineal space traversed by the wrist during this bar outlines one complete ellipse. Each exercise must be repeated many times during the prolonged "hold" of the pair of fingers. The exercises will at first be played with contiguous fingers. Let the student refer again to the diagram near the beginning of this Section to remind him of the

direction in which the wrist-centres travel during the following exercises.

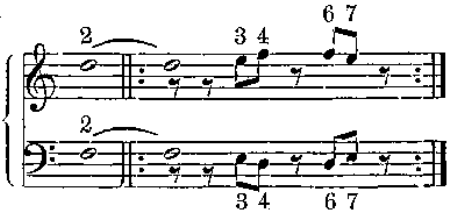
Ex. XX. 2nd fingers held.



Ex. XXI. 4th fingers held.



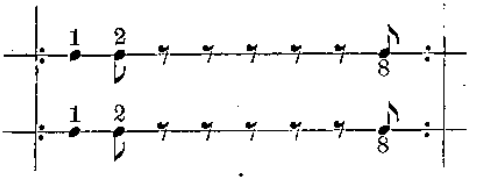
In order that the student may make no mistake as to the meaning of the above peculiar "scoring," Ex. XX. is here given in "full" score.



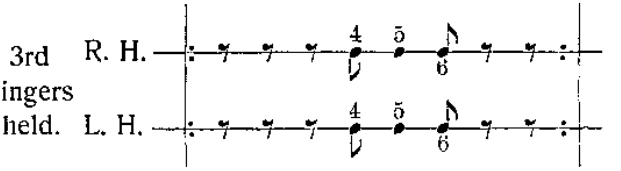
SECTION 41.

In Ex. XX. and XXI. the least number of sounds possible in legato-playing is used — namely, two. In the following exercises three sounds will be made use of. For this purpose two fingers only are necessary, if they are contiguous. One of these will be used twice — once in the upper, and once in the lower-curve.

Ex. XXII. 3rd fingers held.



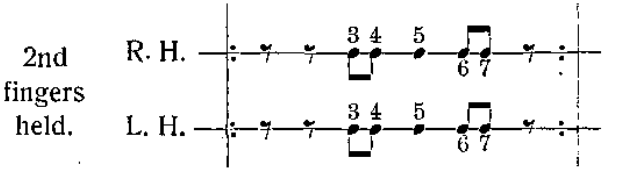
Ex. XXIII. 3rd fingers held. R. H. L. H.



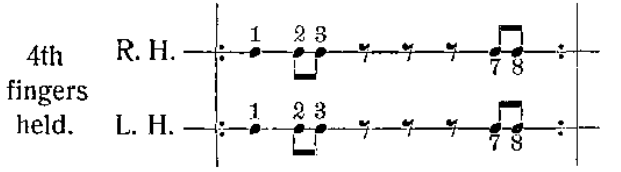
In Ex. XXII. beat 2 and 8 represent in both hands the same note, and therefore are played by the same finger. In Ex. XXIII. the same is the case with beat 4 and 6. If the student has thoroughly understood the diagram given in the first paragraph of Sec. 40, he will see why this is so.

In Ex. XXII. and XXIII. the legato-practice occurs at those parts on the periphery of the ellipse which for convenience have been called East and West. The student may recollect that in Sec. 34 it was said that irregularity of outline was likely to occur more frequently at these sharper parts of the ellipse than at the flatter parts. Let him therefore practise these two exercises until the curve-outline is perfect.

Ex. XXIV. 2nd fingers held. R. H. L. H.



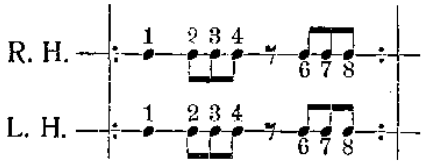
Ex. XXV. 4th fingers held. R. H. L. H.



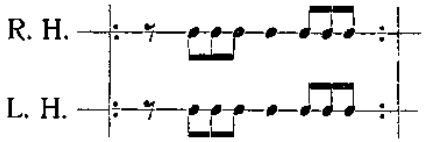
In Ex. XXIV. and XXV. will be seen an extension of the legato sequence to five sounds — with one held finger in each hand.

In the two following exercises the sequence is extended to seven — still with a held finger in each hand.

Ex. XXVI. 5th fingers held.

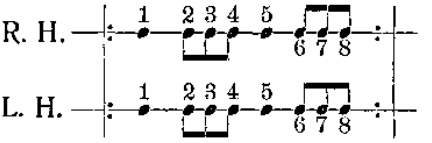


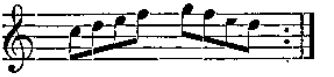
Ex. XXVII. 1st fingers held.



If the student has worked faithfully at the exercises in the preceding five Sections, he will now be able to play the Note-pattern given at the beginning of Sec. 37, in which there is of course no held finger. In compressed score it appears so:

Ex. XXVIII.

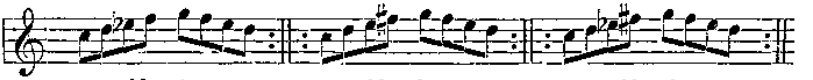


The term "Note-Pattern" has been applied to a set of consecutive notes played while one equally divided elliptical rolling-motion is executed.* The figure  which the student is now able to play with the rolling-motion is one of the simplest forms of note-pattern; and he has seen that it and the outline (periphery) of the Ellipse have been "fitted" to each other. The above note-pattern must be transposed into every major key. Let the student not forget the sliding thumb when beginning the lower curve of the "ordinary" ellipse. Re-read end of Sec. 35.

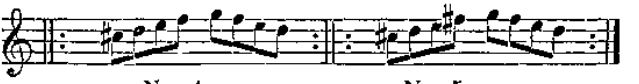
*) See Bandmann: "Gewichtstechnik".

SECTION 42.

The student must practise the following variants of the above Note-pattern in order to accustom himself to trust to the rolling-motion to guide the finger-tips to their places over the required keys. To execute properly any one of these variants, a certain spot on each key must be touched by the finger belonging to that key, and the particular lie of this spot is settled by the special build and size of the hand. If the spot on each key could be marked, and a line drawn from the spot on the first key of the variant to the spot on the next key — and so on — the graphic result would be what Steinhausen calls a "key-picture." To guide each finger-tip to this spot on each key with the minimum of hand-exertion is one duty of the rolling-motion of the arm.



No. 1. No. 2. No. 3.



No. 4. No. 5.

Each of these variants must be played with both hands simultaneously, and in contrary motion — the left-hand two octaves lower than the right. They must then be transposed into every key; and, to do this easily, the student should think of each variant as embodying certain portions of the scale.

No. 1 is the first five degrees of the minor scale.

No. 2 is the five of a major scale, beginning on the fourth degree.

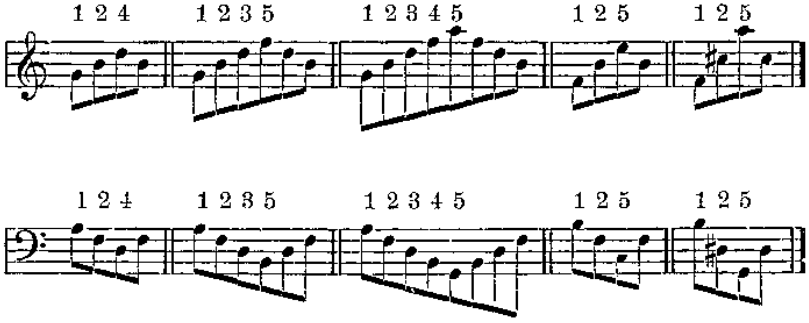
No. 3 is the five of a minor scale (harmonic) beginning on the fourth.

No. 4 is five of the minor scale beginning on the seventh.

No. 5 is five of the major scale beginning on the seventh.

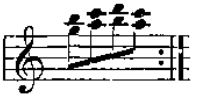
In endeavouring to produce a series of equal-sounding tones in these sixty (5×12) variants, let the student keep well in mind what was said in Par. 1 of Sec. 23, and in Sec. 29, about the unceasing · undulating movement of the wrist caused by the delicate alteration of the line-relation between arm and hand. All inequalities of tone-volume heard while playing must be attributed not to inequality in the s t r e n g t h of the fingers concerned, but to a faulty distribution of the Weight of the Arm, consequent on a faulty use of the rolling-motion: (see Sec. 39, 2nd Paragraph). The important part which the t e n s i o n of the muscles of the hand, arm, and shoulder plays in the furtherance of weight-distribution will be spoken of afterwards: Chap. XV.

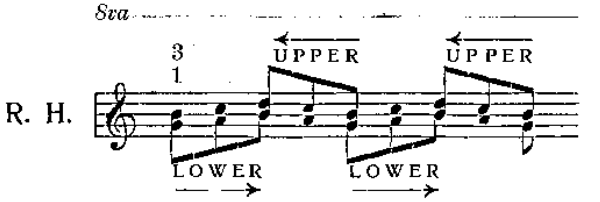
Note-patterns in which the interval between the contiguous notes is not less than a minor third, and which are played to an "ordinary" ellipse divided equally (Sec. 36, Ex. XIII.) are the following arpeggios:



The appearance of some of the above note-patterns will probably create the idea that the fingers, while playing them, will need to be stretched widely apart. With regard to this

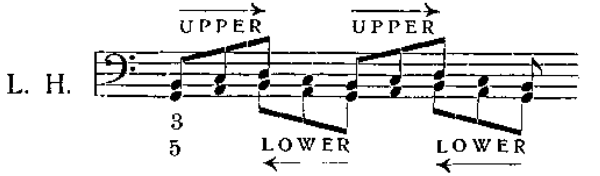
matter the student should refer to the remarks made in Sec. 44 and 46 concerning an exaggerated use of Stretch. The sliding of the thumb must be kept in mind.

Ex. XXIX. In a passage such as the following:  in which an upper and a lower set of notes are played simultaneously — commonly called a "double-note" passage — the curve-line, instead of being elliptic, approaches more nearly to the circular. The curves illustrated are as follows:

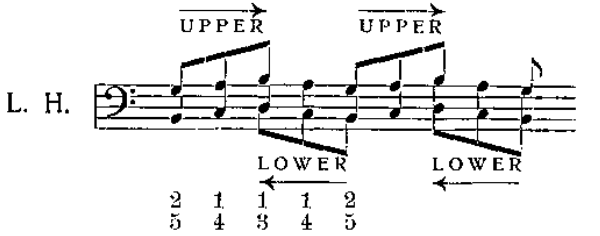


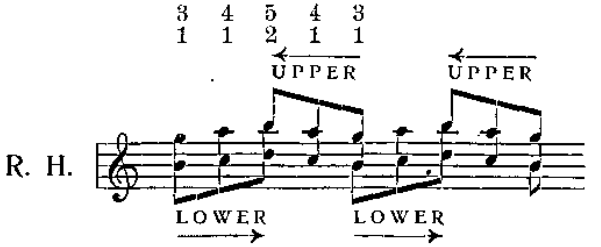
It will be seen from the above that the one curve almost immediately turns back into the other.

For the left-hand the curves will be as follows:

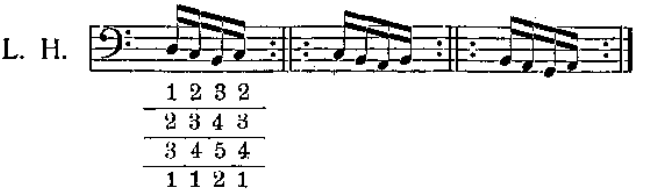


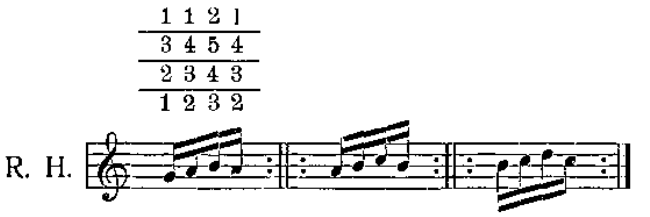
The curves for a similar passage in sixths will be:



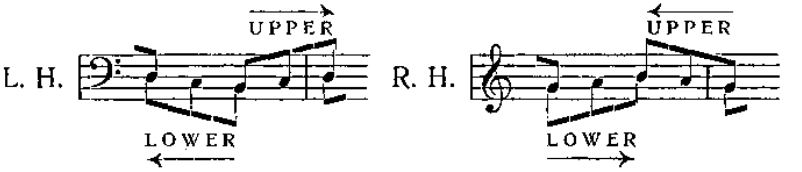


The following Exercises in single notes will facilitate the execution of the "circular" wrist-curve-lines necessary for the above double-note patterns.





And the illustration of the circles necessary for both hands is:



CHAPTER X.

THE ELLIPSE DIVIDED UNEQUALLY AS TO SPEED. FITTING THE "ORDINARY" ELLIPSE TO THE NOTE-PATTERN. UNEQUAL CURVE-LENGTHS.

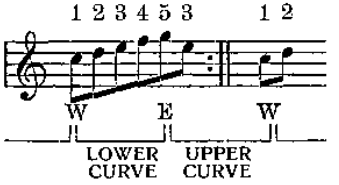
SECTION 43.

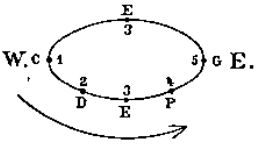
In the journey made by the hidden centre of the wrist round the Ellipse, it was shown — Sec. 30 — that each of the eight equal lengths into which the line of its circumference is divided was travelled over in the same length of time. The necessity for this arose from the fact that the number of equal-length notes played in the lower-curve between the note played by the first-finger and that played by the fifth was equal to the number played in the upper-curve between the fifth and first.

It has been said that the curve-line must be made to "fit" the note-pattern: Sec. 23, No. 7. This must be done not only as regards the type of curve-line (ellipse, figure-eight), but also as regards the s p e e d at which different portions of the same line are travelled over by the wrist-centre.

Seeing that the distance from point West to point East along the upper-curve of an ellipse is equal to that along the lower-curve, if the r h y t h m i c d i s t a n c e in the music, through the sequence of notes played during the lower-curve is l o n g e r than the rhythmic distance during the upper-curve,

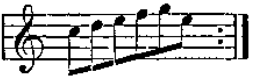
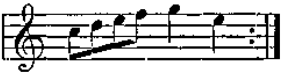
the wrist-centre will accordingly have to travel along the upper-curve more quickly than along the lower one. Conversely: if the time-value of any note in the note-pattern is equal to that of any of the other notes, and the whole time occupied in traversing the sequence of notes played to — say — the lower-curve is longer than the time occupied in traversing that played to the upper, there must then be a greater number of notes in the lower-curve. The following pattern and its illustrative diagram will show this.





From these it will be seen that the rhythmic distance on the printed music is longer on the lower-curve from the note at point West — C — to that at point East — G — than it is on the upper-curve from the note at point E back to that at point W; and accordingly, that the lower-curve must be travelled over more slowly than the upper.

The student must keep in mind that it is impossible to guess the rhythmic distance from one note of the printed music to another by means of the method of graphic illustration adopted here. The two passages

 and 

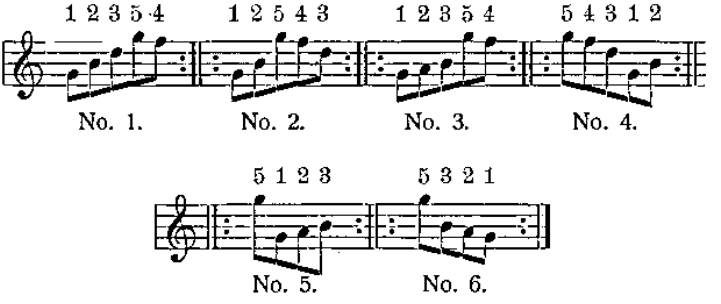
which are of different notation and rhythm, are illustrated graphically in the same manner, namely, that given above. The relative distance (lineally) from dot to dot on the curve-line does not illustrate the relative distance (rhythmically) of note from note on the printed music. Some examples of the ellipse divided unequally as to speed will be given in the following section.

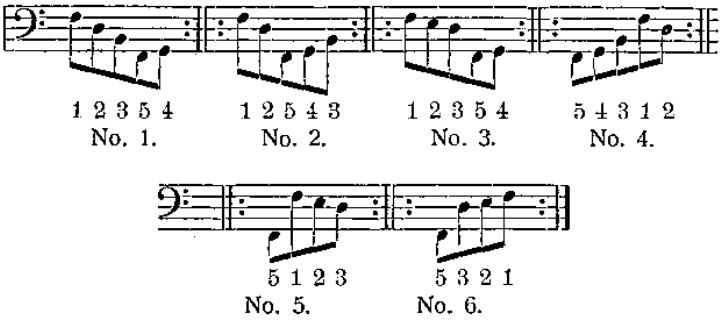
SECTION 44.

FITTING THE "ORDINARY" ELLIPSE TO THE NOTE-PATTERN.

It will be easy for the student while examining any note-pattern to decide as to which of its notes are to be played on the lower and which on the upper-curve of the ellipse if he will only remember that, as a general rule, the note played by the first-finger (the thumb) is the note on which the lower-curve starts — this refers to either hand — and that the note played by the fifth (often the fourth) finger is that on which the upper-curve starts. When the fingering is fitted to the two curves in this manner the whole ellipse is known as the "ordinary" ellipse. Let the student, for mnemonic purposes, think of the finger with the low number — 1 — as starting the "low" curve, and the finger with the high number — 4 or 5 — as starting the "high" curve. This rule is not an invariable one, as will be seen when the curve-line is applied to the figure-eight, and to scale-playing. Some arpeggios also are exceptions. But in the meantime the student may follow that rule. Let him keep in mind the gentle thumb-slide mentioned at the end of Sec. XXXVII.

Ex. XXX.





If any note-pattern in either clef in the above set be compared with the one in the other clef bearing the same number, the two will be found to have the same order of fingering. They may therefore be practised with both hands simultaneously, after they have been made perfect with both separately.

The student will note that, in accordance with the general rule given at the beginning of this section, Nos. 4, 5, and 6 start with the upper-curve.

In all the above examples of the ellipse divided unequally, Pronation and Supination of the fore-arm come much into play. This pianistic resource, the importance of which Steinhausen and Matthay have drawn attention to, does away to a great extent with the exaggerated muscular-tension of hand and arm caused by stretching the fingers apart unnecessarily. The amount of pronation and supination needed for the avoidance of this unnecessary stretch varies according as the size and build of hand vary. The hand with an easy stretch between the fingers and a good breadth across the knuckles, will naturally make less effort than will either the narrow hand or the hand with tightly bound knuckle-joints. But even in the case of the hand endowed with a naturally easy stretch there ought to be no attempt made to curb — much less

eliminate.— the free and gentle swaying or waving movement of the hand which this delicate rotary-action of the fore-arm creates.

The note-patterns in the above set most difficult to fit with their exact curve-figures are Nos. 3, 5, and 6. In these, the intervals of the sixth, seventh, and octave will cause a little trouble. To minimise this, the wrist must be raised considerably while the hand is supinated.

In No. 5, the whole of the upper-curve of the ellipse is executed between the first and second note; and in No. 6, the whole of the lower-curve between the last note and the first. Between the moments at which the first and fifth fingers in these two note-patterns sound their "contiguous" notes, the wrist-centre must travel along the curve-line at increased speed, if the rhythm of the figure be kept intact. This alternate quickening and slackening of the speed at which the wrist-centre is made to travel round the line (circumference) of the ellipse must not be allowed to alter the form of that line.

SECTION 45.

UNEQUAL CURVE-LENGTHS.

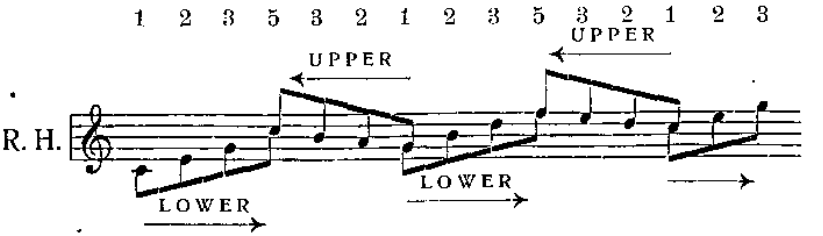
In the note-patterns hitherto described, the curves fitted to them have been the upper and lower ones of the elliptic figure; and both of these are of equal dimension. But in piano-music there are many note-patterns which an Equality between the out-going and the returning curves will not fit. Such note-patterns are found in passages of a sequential type proceeding either up or down the keyboard: Sec. 47.

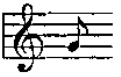
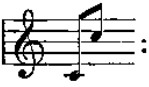
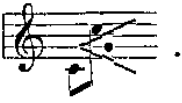
In a sequential series of note-patterns if the note played in any curve by the thumb lies between the extreme notes of either the prece-

ding or the following curve, the size of any two contiguous curves in the series will be unequal.

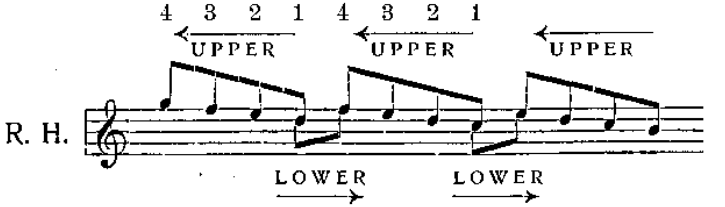
The two following examples will make this more easily understood. In the upper-curves a discrepancy will be noticed between the direction in which the arrow points — to left — and that in which the printed notes follow each other — from left to right. The arrow points in the direction in which the wrist-centre travels at that moment.

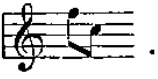
No. 1.



In the above ascending sequence, the seventh quaver — G —  lies between the extreme notes of the preceding curve, namely,  : thus,  .

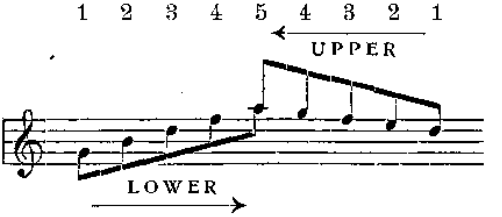
No. 2.



In a similar manner the fourth quaver — D — in the descending sequence in example No. 2, lies between the extreme notes of the following curve; namely  .

SECTION 46.

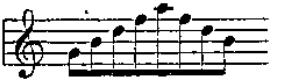
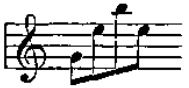
An important point must be noted in connection with the Inequality of these contiguous wrist-curves. If, for instance, the following figure



is played with the fingering given, it will be seen that in the lower-curve, between the extreme notes, the interval of a n i n t h (between G and A) has to be traversed, using the fingers consecutively from 1st to 5th; while in the upper-curve (from A down to D), the interval between the extreme notes is only a f i f t h. The time-distance from each note of the figure to the next is equal throughout, and the time occupied in traversing the lower-curve is equal to that occupied in traversing the upper — the number of notes in both curves being the same. But in the lower-curve, the five piano-keys touched are in the order of "every alternate one"; while in the upper-curve they are contiguous. Therefore, the speed travelled at by the wrist-centre during the lower-curve is greater than that travelled at during the upper. If the above figure be played, and the size of its lower-curve (outlined by the wrist between G and A) be compared with that of its upper (outlined between A and D), it will be seen that the upper-curve-line is about half the length of the lower one. In other words, the wrist will move along about twice as quickly in the lower-curve as it will in the upper.

It is hoped that the student will prove this ocularly; for this reason, that if he thinks he sees that such is n o t the case, he is executing the rolling-arm-motion wrongly. He is

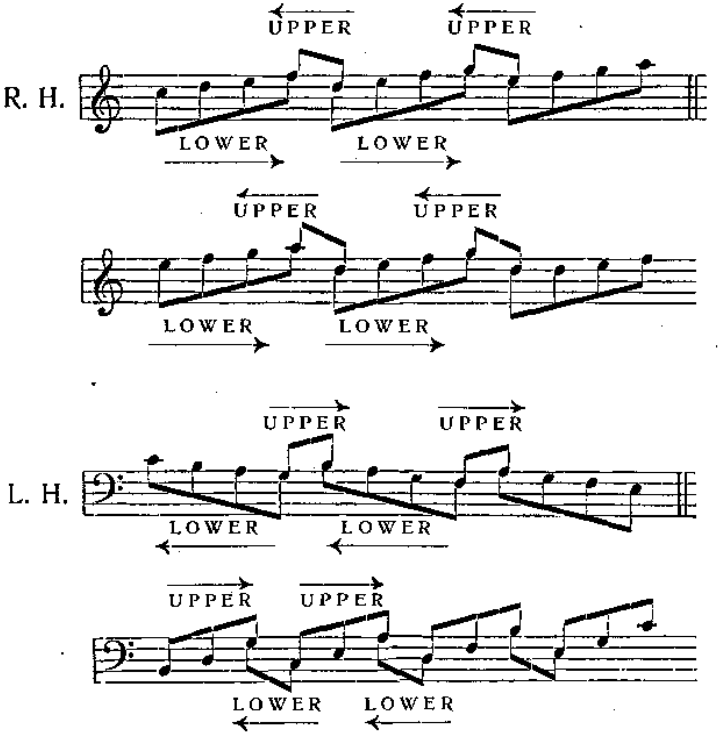
then probably stretching the fingers sideways from each other too much during the lower-curve, thus using the muscles of the hand too actively, instead of keeping the latter (the hand) comparatively passive, and allowing it to be drawn gently round by means of the action (on the whole arm) of muscles near the shoulder: Sec. 37, last paragraph.

There is a certain natural tendency in the student, even when he is merely glancing at passages (note-patterns) in which the printed notes are not contiguous — that is, the keys on the piano are not contiguous — such as  or  to think that the best way to execute these is to actively stretch the hand and fingers — the "open" appearance of the printed music suggesting an actively opened hand. But a roll of the arm will obviate the necessity for any more than comparatively passive action of the hand, which will consequently reduce the "stretch-between-the-fingers" to a minimum. This comparative passivity furthers the correct distribution of Weight to the keys, and gives a feeling of ease to the hand and arm. It also tends to the production of the finest legato-tone.

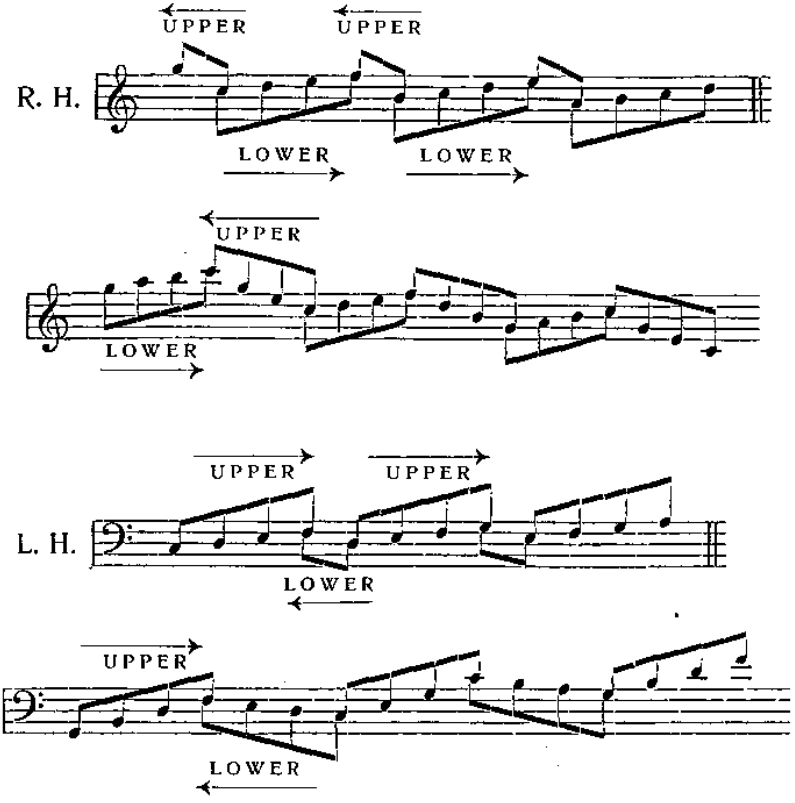
SECTION 47.

The sequential type of note-pattern — in which the last note of any curve is not of the same pitch as the first note of the previous one — is of common occurrence in piano-music. Seeing that in a sequence, each repetition of the note-pattern must be higher or lower in pitch than the preceding one, a consequent feature of every sequence is: Progression up or down the keyboard. In order to bring this about, the two curves fitted to the sequence must be of unequal length.

When either hand ascends or descends, the one curve must necessarily be longer than the other. The l e n g t h of each curve depends on the distance on the keyboard between the two extreme notes of the pattern, and the interval between the last note of one pattern and the first note of the following one. Some examples will show this.



When to an "ordinary" ellipse the right hand plays a descending sequence, or the left hand an ascending one, the upper-curve must necessarily be longer — of greater interval between its limit notes — than the returning lower one. The following examples show this.

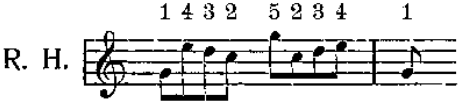

UPPER
UPPER
R. H.
LOWER
LOWER
UPPER
LOWER
UPPER
UPPER
L. H.
LOWER
UPPER
LOWER

CHAPTER XI.

THE ELLIPSE WITH IRREGULAR FINGERING. THE ELLIPSE IN COMPOUND MOTION.

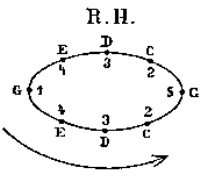
SECTION 48.

In all the exercises which the student has as yet practised it will be noticed that, in each curve, the fingering proceeds "regularly" from 1 to 5 either directly or in a series of numbers in ascending order of magnitude; and from 5 to 1 either directly or in a series in descending order: that is, in the sequence of numbers leading up from 1 to 5, each number was higher than the preceding one; in the sequence after 5, each number was lower. An example of the converse of this is seen in the following passage:



where the order of the numbers is "irregular." In accordance with the general rule given at the beginning of Sec. 44, the lower-curve in this passage will be executed while 1, 4, 3, 2, 5 is played, and the upper-curve while 5, 2, 3, 4, 1 is played.

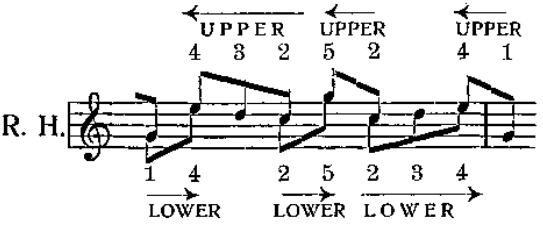
Graphically this will be represented so:



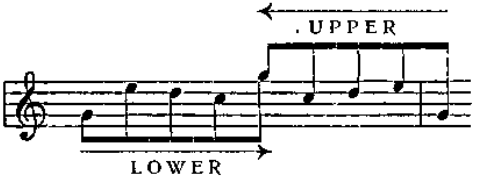
If this diagram be compared with that given for the right hand in Sec. 31, it will be seen that, in the latter, the lower-curve

is played to a series of numbers (fingering) in ascending order of magnitude, and the upper-curve to a series in descending order. The diagram given in this section institutes therefore a departure from that manner, and shows that a sequence of numbers (fingering) in descending order of magnitude (4, 3, 2) may be played to a lower-curve, and one in ascending order (2, 3, 4) to an upper. Seeing that between 1 and 5 there is in the diagram the same number of notes on the lower-curve as there is on the upper, and that the last note leads directly back to the first, the upper and lower-curves will together make an endless figure, and its whole line will be equally divided.

This same note-pattern might be executed as follows:

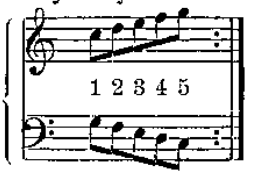


that is, with six rolls of unequal curve-lengths. But the more economical way to execute it is to fit it with two rolls of equal length:



The student's chief difficulty here will be to accustom himself to execute either the lower-curve (between 1 and 5) or the upper-curve (between 5 and 1) whatever order of fingering may occur between the two outside fingers of these curves. A thorough training in this

matter may be had if he will practise the exercises given in the following table. Each of the 24 "changes" contains two curve-lines of unequal length; and all the possible inequalities are contained in the table. They must be practised in every major and minor key, to the following note-pattern:



and also according to the pattern of the five variants given in Sec. 42.

Ex. XXXI.

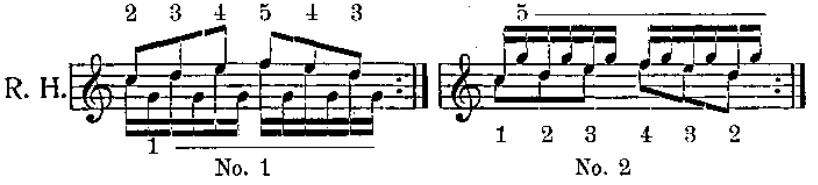
1	2	3	4	5	1	3	2	4	5	1	4	2	3	5	1	5	2	3	4
1	2	3	5	4	1	3	2	5	4	1	4	2	5	3	1	5	2	4	3
1	2	4	3	5	1	3	4	2	5	1	4	3	2	5	1	5	3	2	4
1	2	4	5	3	1	3	4	5	2	1	4	3	5	2	1	5	3	4	2
1	2	5	3	4	1	3	5	2	4	1	4	5	2	3	1	5	4	2	3
1	2	5	4	3	1	3	5	4	2	1	4	5	3	2	1	5	4	3	2

In any of the above "changes" where three figures stand between 1 and 5, that is, on the lower-curve, the wrist, between these outer figures, is travelling at the lowest speed possible for the note-pattern: the same is the case when three figures stand between 5 and 1, that is, on the upper-curve. When no figure stands between 1 and 5 (lower-curve) or between 5 and 1 (upper-curve) the wrist, between these outer figures, is then travelling at the highest speed. The relative speed at which the wrist-centre travels over the two curve-lines of any of these "changes" will be indicated by comparing the number of figures lying between the 1 and the 5 of the lower-curve with the number between the 5 and the 1 of the upper-curve — the more figures the less speed. In working at the above 24 "changes" the student will find that those in which the wrist travels at its highest speed are

those in which also it travels at its lowest. This juxtaposition of highest and lowest occurs in twelve of the changes. In the remaining twelve, the inequality between the speed of the two curves in each ellipse is less marked.

After the student has mastered the roll-difficulties met with in playing the series of 24 permutations (or "changes") given above, he must combine them in all possible ways. Playing the first one — 1 2 3 4 5 — with the right-hand, let him to this constant 1 2 3 4 5 play, with the left-hand, each of the 24 in turn. This alone will give 24 combinations. If this plan be carried out similarly with each of the twenty-four, a series of 576 (24×24) combinations will be obtained. Many of these will be found to be of unexpected difficulty. If carefully studied, they will smooth away for the student some of the brain-worries to be met with in the works of that master of Combination, J. S. Bach.

Ex. XXXII. A curious type of irregularity of fingering is presented by the following note-patterns:



No. 1 No. 2

To make the quavers sound as legato as possible they must be played with the arm-rolling-motion to an "ordinary" ellipse. The reiterated G in both examples must not be allowed to interfere with the perfection of the wrist curve-line. The student will have some trouble in mastering this difficulty.

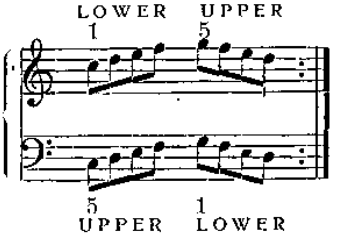
A still more troublesome problem for him to solve is the playing of No. 1 in the right-hand along with No. 2 in the left — the latter taken two octaves lower. This is a difficult

example of "Compound parallel motion" treated of in the following section, and had better be left until some of the less complex examples there have been studied.

SECTION 49.

COMPOUND MOTION.

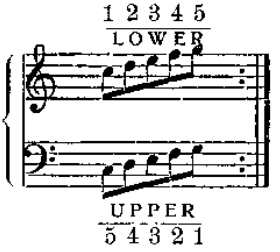
At the end of Sec. 36, in No. 3 of Ex. XVIII., the student will find a method of outlining the ellipse termed compound-parallel. Such a note-pattern as the following:



which appears, in notation, as parallel motion, is played with a compound-parallel rolling-motion. In Sec. 36 it was said that the compound nature of the motion is produced when the lower-curve of the ellipse in the one hand is executed simultaneously with the upper-curve in the other. The student will perhaps recollect that at the beginning of Sec. 44 the "general" rule was given that the lower-curve starts with the low-numbered finger, and the upper-curve with the high. This refers to either hand. It will be seen that, in the above note-pattern, the right-hand starts with 1, and the left with 5; and that at the "half-bar" this order is reversed. The bar therefore starts with a lower-curve in the right-hand and an upper in the left; and this is reversed in the latter half of the bar. If the student has mastered the four pairs of outlines given in Ex. XVIII., Sec. 36, with all the combinations there recommended, he will have little difficulty in falling into the knack of executing this seemingly complex arm-roll.

In the note-pattern given above, the ellipse traversed during the eight notes in "divided equally" — there being the same number of equal-length notes between the outer figures of both curves, namely three.

Ex. XXXIII. Good material for the cultivation of compound-parallel arm-roll may be got by using the combinations mentioned in the last paragraph of Ex. XXXI. In the combinations for this complex arm-motion all the changes must be played using the same notes simultaneously in both hands. In each of the changes the figures used in the left-hand will therefore occur in different order in the right. For example, the first of the original 24 — Sec. 48 — will appear so:



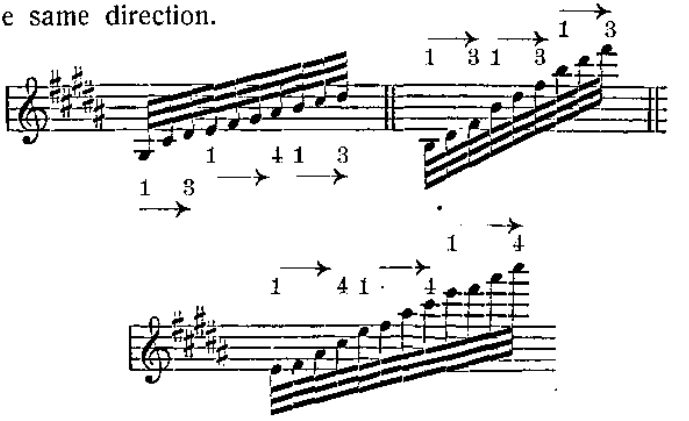
CHAPTER XII.

THE LOOP. THE "REVERSED" ELLIPSE. THE FIGURE-EIGHT.

SECTION 50.

The note-patterns as yet demonstrated have been of that type to which it is possible to fit a pair of either equal or unequal curve-lines, one of the curves in each pair returning upon the other either wholly or only in part. In the note-pattern thus fitted, the limit finger — that is, the last finger — of the outgoing curve is also the starting finger of a curve travelling in contrary direction — a lower-curve being "answered" by an upper, or vice versa. A similarly "answering" direction will have been observed in the notation of each of the patterns previously given.

But in a scale of more than nine notes, and in the extended arpeggio of more than two octaves, (see Chap. XIV.) the whole passage contains several contiguous note-patterns proceeding in the same direction.

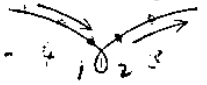


In each of the above examples will be seen three of such note-patterns. Each note-pattern must be "joined" to the following one if the passage is played l e g a t o; and it is the duty of the arm while pivoting on the first-finger (the thumb) to make this "join" by means of a curve-form called the Loop. This feature was first drawn attention to by Clark-Steiniger in his treatise, "Die Lehre des einheitlichen Kunstmittels beim Klavierspiel," published in 1885.

SECTION 51.

The movement made in executing the Loop is a very small and delicate twist — rotary movement — of the fore-arm, made while it and the upper-arm are simultaneously moving slowly sideways, either away from or towards the body. The movement appears to be focussed at the wrist. While the loop is being made, the first-finger (the thumb) is always in the act of holding down a key; and the arm turns on the thumb as on a pivot. The following diagrams may help the student to realise the outline of the loop as "drawn" by the hidden centre of the wrist.

No.1.
Ascending.



For R.H. or L.H.

No.2.
Descending.

For R.H. or L.H.

The figure 1 has been placed inside the loop to keep the student in mind of the fact that it is o n the first-finger — the thumb — that the twist of the loop is made: that is, the loop is made while the first-finger is holding down its key, and not before that key has reached low-level.

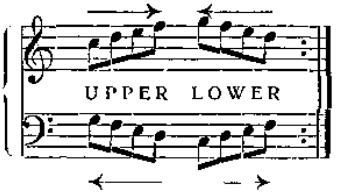
If the student examine the above diagrams he will notice that, w i t h t h e e x c e p t i o n o f t h e s m a l l l o o p, they contain u p p e r - c u r v e s only. He will notice also that, these

curves in the right-hand ascending scale travel to the right, and in the left-hand descending scale to the left: in both cases, therefore, in the direction away from the centre of the keyboard. And he will recollect that, in the ellipse previously taught, all upper-curves when coupled with tone-production have proceeded, in both right and left-hand, in the direction towards the centre of the keyboard. The reason for this change here is that, if the loop is "entered" from an upper-curve instead of from a lower, the hand, on completion of the loop, is then in the best position for being guided in the direction (up or down the keyboard) in which the note-patterns succeed each other in the scale or arpeggio. This will be understood better when the making of the loop itself is explained: Sec. 53.

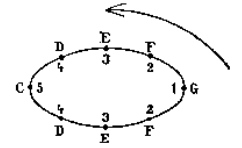
SECTION 52.

THE "REVERSED" ELLIPSE.

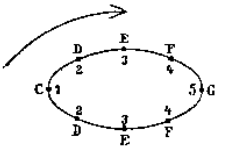
Ex. XXXIV. The student must first accustom himself to play an ellipse in which the upper-curve is made in the direction from left to right with the right-hand, and conversely, from right to left with the left-hand. In the lower-curve of the same ellipse both hands will therefore move towards the centre of the keyboard: see Sec. 36, Ex. XIV. He must practise the following note-pattern



according to the curve-diagram here given:

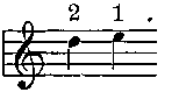


L.H.



R.H.

The unusual "reversed" feeling in the hand, caused partly by playing a fingering represented by a series of numbers in ascending order of magnitude — 1, 2, 3, 4, 5 — to an upper-curve made in the direction away from the centre of the keyboard, will be got rid of more quickly if the student, especially during these upper-curves, will turn the "outside edge" of both his wrists in the direction along the keyboard away from the centre. This pose of hand and arm — sometimes known as the "Deppe" hand-position — does away to a great extent with the necessity for an active turn-under of the thumb in scale playing; that is to say, less of an active turn-under is necessary, if the wrist be turned sideways, as above described. It is impossible in scale-playing to abolish — as some modern writers would seem to wish — all Activity on the part of the first-finger (the thumb), seeing that, even if the latter proceeds to a key only one beyond that which the second finger has just been holding, as

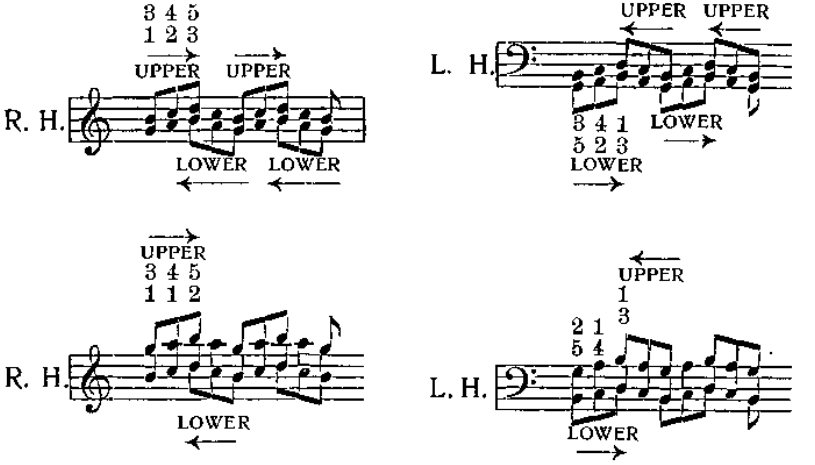
R. H. 

it cannot have arrived there (in legato-playing) without some activity of its own muscles: in other words, without a turn-under. It would perhaps be more correct to consider the act which brings the point of the thumb on to its key in scale or arpeggio passages (right-hand ascending, or left-hand descending) as partly a thumb-action, and partly an arm-action.

The above-mentioned unusual feeling in the hand while executing this "reversed" ellipse, arises also from the fact that, in putting a key down with the thumb, it is easier for that finger to approach and depress the key when the wrist-centre is descending on a curve-line than when ascending on one. But in this "reversed" ellipse the thumb approaches its key at the conclusion of a curve starting on the Descent.

This particular approach is used in one of the halves of the figure-eight — to be explained later on: Sec. 54. It is mentioned here also because it is found in the complementary (lower) curve of the ellipse whose upper-curve is the arm-roll used so much in scale-playing; see end of Sec. 51. Some preliminary practice for this the student may obtain if he will transpose into every key — major and minor — the note-pattern given at the beginning of this section. In a "reversed" ellipse the thumb does need to slide on its key.

Ex. XXXV. The student may here practise the note-patterns in thirds and sixths given at the end of Sec. 42, playing them now to the reversed ellipse, or — in this case more correctly speaking — reversed "circle." This manner of playing them will be found necessary when "double" scales come to be studied: see Chap. XVII. The following are the illustrations for their curves:



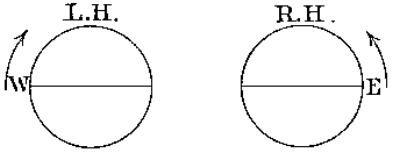
SECTION 53.

Ex. XXXVI. Perhaps the easiest preparatory exercise for making the Loop will be the following:

1. Hold down any white key with the thumb.
2. With both fore-arm and upper-arm moving conjointly, make a spherical wrist-outline of fairly large size, and in the following directions:

These are used in scales and arpeggios for the right hand ascending, and the left descending.

3. While making this circular wrist-outline add to it a slight rotary action of the fore-arm, supinating the hand while the upper half of the circle is being outlined, and pronating it on the lower half. This last remark applies to both hands. See Sec. 18.
4. For the right-hand descending, and the left ascending, the following are the diagrams:



The supination of the hand takes place here on the lower-curve of the circumference, and the pronation on the upper-curve. While the wrist-centre is thus revolving round an imaginary centre the hand itself submits to these fragmentary rotary movements of the fore-arm.

The student's greatest difficulty will be found at the "outsides" of these circles; that is, at East for the right hand, and at West for the left, where supination merges into pronation: or vice versa. In the diagrams, a line — the

"equator" — has been drawn from E. to W. At point E. in the right hand, and W. in the left, there must be no jerk during the change from supination to pronation. The change must begin, in both wrists, just b e f o r e these points on the circumference are reached. Therefore, it must begin near the point at which the wrists reach their outermost position. This — the "Deppe" hand-position — has been spoken of in the foregoing section. This outermost position of hand is one of the extreme limits to which it is capable of going. It is one, however, in which it ought not to remain fixed, seeing that the hand and arm ought always to be "on the move." But to neglect to proceed to this limit while practising this circle would prevent the student from being able to change gently from Supination to Pronation while using the Loop.

As the student acquires more facility in making this delicate change he must also r e d u c e t h e s i z e of the circumferential outline made by the wrist. This must be done gradually, until the action of the wrist, when making the circle, is reduced to a minimum — is almost invisible. See end of Sec. 35.

If the student will refer to Sec. 26, Figs. 25 and 26, he will see diagrams of four upper-curves connected by the loop. In that Section it was given as a tracing for the arm. Let him keep in mind, when playing the scale, that this loop outline is "drawn" by the hidden centre of the wrist: see the latter half of Sec. 58.

In the practical application of the loop to scale-playing, for the right descending, or the left-hand ascending, the act of sliding the fingers across the thumb — the loop-finger — from one note-pattern position to another is accomplished at the v e r y l a s t part of the loop — just when the next upper-curve begins for the following note-pattern of the scale. The physical feeling at this moment is as if the fore part of the

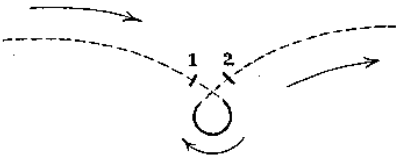
hand — the knuckle and finger part — were being swiftly pivoted across the keys by means of the thumb's leverage-action on its key. The whole of this complicated act requires the student's concentrated attention, as on the perfection of the loop the finish of scale-playing and arpeggio-playing greatly depends.

In the descending R. H. scale and in the ascending L. H. the act of Supination is in the Loop, and that of Pronation in the upper-curves.

In making an applied use of the Loop — that is, in applying it practically in Scales and Arpeggios — the student must bear in mind that of the two sides of the figure

(, and)

the one is the concluding part, and the other the beginning of the upper-curve used for the note-patterns of Scales and Arpeggios. This may be more easily understood from the following diagram, which is that for the Right-hand in an ascending scale or arpeggio:



This diagram — in which the figures indicate the fingering — will serve also for the Left-hand in a descending scale or arpeggio, if the arrows are considered as pointing in the opposite direction, and the figures 1—2 be placed on the reverse sides.

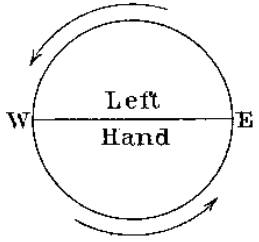
Seeing that, in the Right-hand ascending or the Left-hand descending, while the wrist-centre is in the act of travelling along the upper-curves used for note-patterns in the scale or arpeggio, the hand is Supinating, and that the loop is the

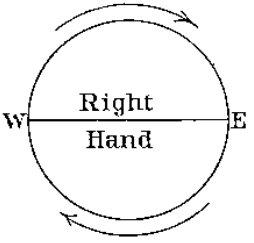
connecting link between two of these upper-curves, the Loop itself cannot be made without some Pronation of the hand.

It has been said — Sec. 51 — that the loop is made a f t e r the thumb has depressed its key, and before the next key is depressed by the following finger. It will be understood from this that, even in a moderately quick scale or arpeggio, the wrist-centre must travel over the line of the loop at a high speed.

The acts of pronation and supination as used in the scale or arpeggio are of course entirely fragmentary Rotations of the lower-arm, and must be imagined and executed most delicately.

The following is a detailed description of the arm-and-hand action used while connecting the upper-curves of a scale of more than o n e octave — or of an arpeggio of more than t w o octaves — for the right-hand ascending, or the left-hand descending. The following diagrams must be carefully referred to by the student:





Hold at low-level any white key with the thumb of either hand, and execute a wrist curve-line of circular shape. While doing so count ONE — TWO — moderately slowly.

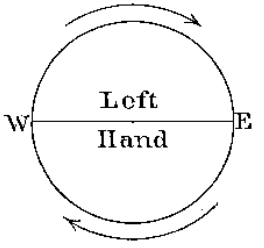
Begin the circling wrist-movement at point E in the right-hand, and at point W in the left. Count ONE just as the movement begins. When the wrist-centre has concluded the half of the circumference, and just as point W in the right-

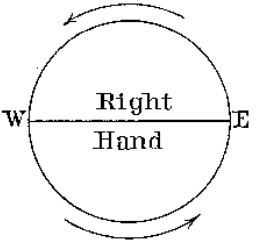
hand and point E in the left are reached, count TWO, and simultaneously depress with the second finger of the right-hand the white key lying immediately a b o v e the one held down by the thumb, and with the second finger of the left-hand the white key immediately b e l o w. Keep this key depressed until the complete upper half of the circumference has been traversed, and then allow the second-finger to let its key rise to high-level. Point E in the right-hand, and point W in the left have now been reached, and the whole circle completed.

It must be particularly noticed that the putting down of the key with the second-finger has a strong tendency to break the continuity of the wrist-movement. This it must not be allowed to do: as on the absolute perfection of the unbroken circle depend the ultimate speed and equality of the scale or arpeggio.

Repeat the exercise many times, the thumb held continuously.

The following is a detailed description of the arm-and-hand action used while connecting the upper-curves of a scale of more than o n e octave, or of an arpeggio of more than t w o octaves, for the right-hand descending, or the left-hand ascending. The following diagrams must be carefully referred to by the student:





Hold at low-level any white key with the thumb of either hand and execute a wrist curve-line of circular shape. While doing so count ONE — TWO — slowly.

Begin the circling wrist-movement at point W in the right-hand, and at point E in the left. Count ONE just as the movement begins. When the wrist-centre has concluded the half of the circumference, and just as point E in the right-hand and point W in the left are reached, count TWO, and simultaneously depress with the third-finger of the right-hand the white key lying immediately b e l o w the one held down by the thumb, and with the third-finger of the left-hand the white key immediately a b o v e. Keep this key depressed until the complete upper half of the circumference has been traversed, and then allow the third-finger to let its key rise to high-level. Point W in the right hand, and point E in the left have now been reached, and the whole circle completed.

It must be particularly noticed that the putting down of the key with the third finger has a strong tendency to break the continuity of the wrist-movement. This it must not be allowed to do; as on the absolute perfection of the unbroken circle depend the ultimate speed and equality of the scale or arpeggio.

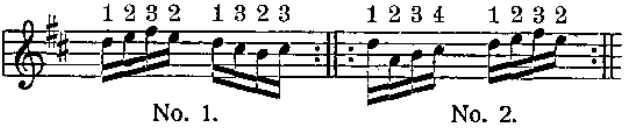
The same exercise must be practised using now the fourth-finger in each hand instead of the third.

SECTION 54.

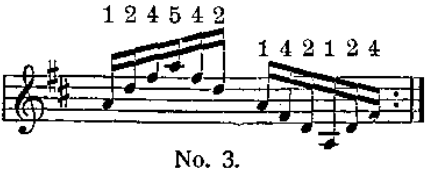
THE FIGURE-EIGHT.

In pianistic acceptation, as applied to the arm-rolling-motion, the term "Figure-eight" signifies two contiguous circles, ellipses, or pear-shaped figures placed laterally — side by side. The particular type of note-pattern to which the figure-eight is fitted, returns on itself. As the figure-eight is of a "dual" nature, the note-pattern which requires that special form of curve must necessarily contain something of a dual nature also. The following are note-patterns of this type.

Ex. XXXVII.

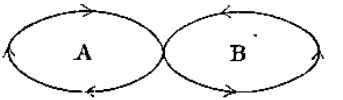


No. 1. No. 2.



No. 3.

And the following diagram illustrates the figure-eight curve-form, giving the direction in which the wrist-centre travels.



When the wrist-centre, travelling along the upper-curve of either ellipse, reaches the point which touches the periphery of the other ellipse it enters that other and travels along the curve in it opposite to the curve in the ellipse it has just quitted. To make this clearer: When the wrist-curve finishes its journey along the upper-curve of ellipse B in the above diagram, it then, without stop, enters the lower-curve of A. The same takes place when passing from ellipse A to B.

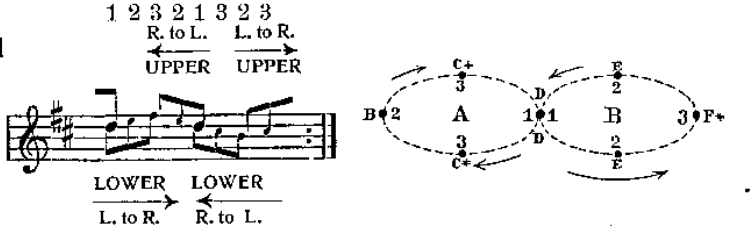
The student will note that while, for the right-hand, ellipse B is of the "ordinary" nature — its lower-curve proceeding from left to right — ellipse A is the "reversed" form mentioned in Sec. 52 — the lower-curve proceeding from right to left. The arrangement is of course reversed in the case of the left hand; ellipse B being then nearest the centre of the keyboard, and thus becoming the "reversed" one. The sinuous character of the movement demands an uninterrupted rotary-action of the fore-arm, causing pronation and supination of the hand.

SECTION 55.

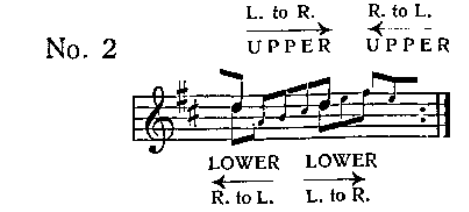
The student will see that in each of the note-patterns given in the previous section there is one note — that played by the thumb — the first-finger — round which the pattern may be said to revolve. This central note in the patterns corresponds to the central point in the figure-eight (diagram) where the one ellipse touches the other.

An analysis of the curves of the above three note-patterns is here given.

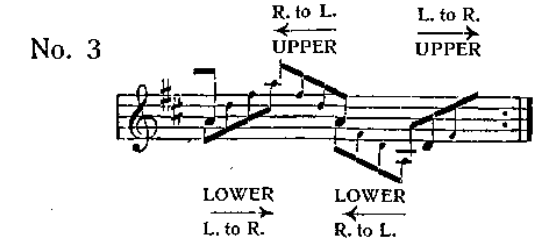
No. 1



No. 2



No. 3

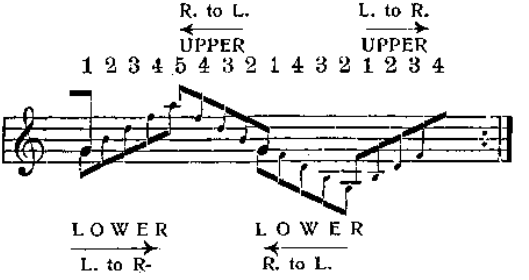


The letters R to L, L to R, indicate the direction in which the curve — whether lower or upper — travels. From these

it will be noted that in No. 2 the "reversed" ellipse comes first; while in Nos. 1 and 3 it comes last. The student will accordingly understand that No. 2 begins with ellipse A; and that Nos. 1 and 3 begin with ellipse B. He will also see that, in these three note-patterns, the first ellipse of No. 2 is the only one in which are to be found u n e q u a l curves.

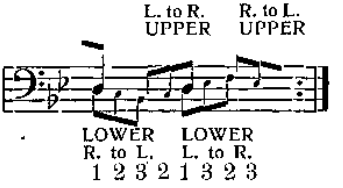
As to the limits of its notational dimension, example No. 1 may be considered as one of the smallest note-patterns to which it would be practical to fit the figure-eight, while the following is one of the largest:

No. 4

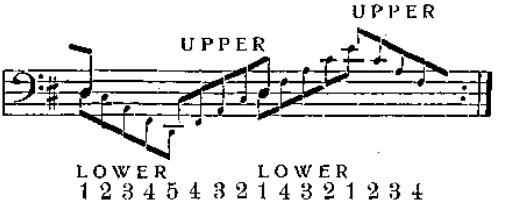


Corresponding note-patterns for the left-hand for two of those given above are the following:

No. 1



No. 4



The student must remember that in both a right-hand and a left-hand figure-eight, ellipse A is used for the notes lying lower down on the keyboard than the central note of the pattern. Also, that the figure-eight need not be fitted to any note-pattern unless the latter has a central note played by the thumb.

The student is recommended to construct for himself note-patterns of various sizes to which the figure-eight may be fitted. Let him, while trying to do so, always begin with the "central" note, played by the thumb.

CHAPTER XIII.

THE SCALE.

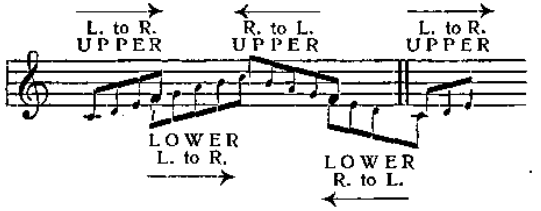
SECTION 56.

In scale-playing all the curve-forms already described are made use of; namely, the "ordinary" ellipse, the "reversed" ellipse, the loop, and the figure-eight. An attempt will now be made to show when these ought to be employed.

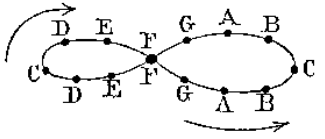
When a scale of one octave, having for its limit fingers 1 and 5 (or 1 and 4) and containing a central "thumb-note", returns on itself, it is played by means of the Figure-eight. The following examples will make this clear:

Ex. XXXVIII.

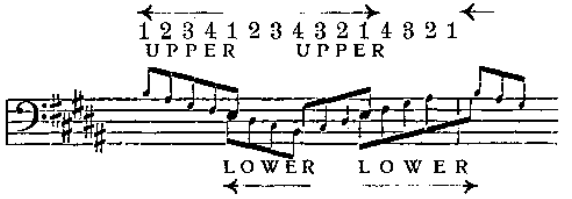
Right Hand.
Central
Note: F.

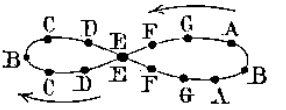


R. H.

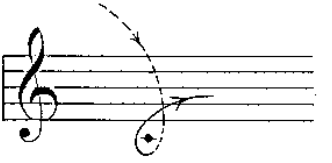


Left Hand.
Central
Note: E.



L. H. 

In both of these examples the second and third curves (lower and upper) constitute the "ordinary" ellipse; while the first and last (or rather, last and first) make the "reversed" ellipse. Three notes of the "repeat" have been added in order to show the connection of the two curves of this reversed ellipse. The beginnings of these scales thus give examples of starting the note-pattern in the "middle" of an ellipse: see Ex. XLII. To let the arm have some "way on" before starting the first upper-curve, the arm and hand may be allowed to fall gently on the first note of the scale, somewhat after the following graphic illustration:



See Bandmann: "Gewichtstechnik," page 51.

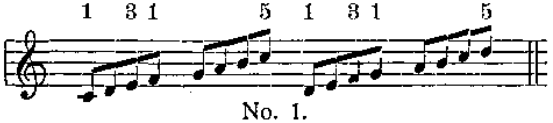
The loop shown here is advisable, seeing that the first curve of the scale itself and the curve made by the fall of the arm antecedent to the first note of the scale *are both upper ones*, and must be joined by a continuous movement of the arm. An ellipse — whether ordinary or reversed — is said to be entered from its "beginning" when the first curve played is the lower one. When this is the case, the antecedent fall of the arm is continued directly — that is, without loop — *into* the lower-curve of the ellipse, whether the latter be an ordinary or a reversed one.

Ex. XXXIX. The one-octave figure-eight scale ought to be worked at with the "C" fingering — 1 2 3 1 2 3 4 5: beginning on each of the five black keys, in both major and minor mode. Let the student practise each hand separately at first — the left-hand beginning with the first-finger (the

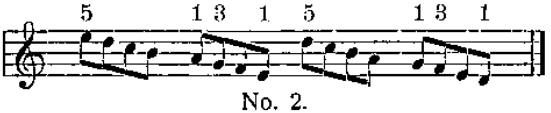
thumb) and proceeding downwards: then with both hands simultaneously in contrary-motion: and lastly, in parallel-motion. When the one-octave figure-eight scale is played in parallel-motion, both wrists will rise and fall simultaneously, seeing that, while the one hand is executing a curve — upper or lower — of the ordinary ellipse, the other hand executes the same curve of the reversed ellipse. A trial at the keyboard will convince the student that this is so.

When the one-octave scale does not return on itself, but is written in the following manner:

R. H.

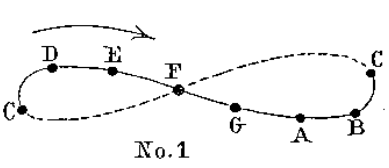


No. 1.

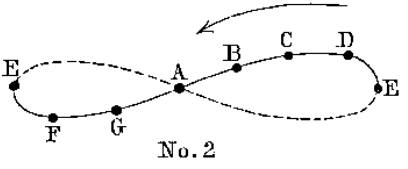


No. 2.

one half of the figure-eight — in order to fit this particular note-pattern — must be travelled over by the wrist-centre more quickly than the other half. The following diagrams illustrate respectively the above two numbers.



No. 1



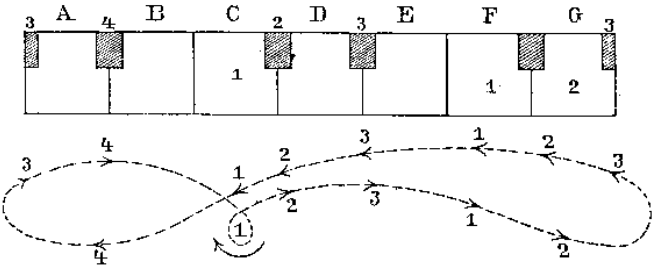
No. 2

These are cases in which the figure-eight is divided unequally as to speed: see Sec. 43. The dotted line is the portion over which the wrist-centre travels at the higher speed.

SECTION 57.

Ex. XL. The student may now begin those one-octave scales in which it is necessary to make use of the Loop. These are, B♭, E♭, A♭, and C♯ major and minor for both hands; F♯ minor for both hands; and F♯ major for the left-hand (F♯ major for the right-hand may be best played by means of the figure-eight — with the fingering 1 2 3 1 2 3 4 5 — B being the "central" note.) But of all these, A♭ and B♭ major and minor for the right-hand, and A♭ and F♯ major and minor and B♭ and E♭ minor for the left, are the only ones that need be specially studied, seeing that each of the remaining ones is similar to one or other of these here selected.

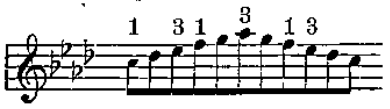
In the one-octave A♭ scale, major or minor, for the right-hand, the Loop-note — C or C♭ — lies more equidistant from the top and bottom notes of the scale than it does in the B♭ scale, and is therefore in a position to be more easily mastered. A diagram is here given of the right-hand curve-line which the wrist-centre traverses in the one-octave scale of A♭ major.



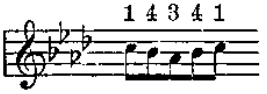
The notation of this is:

The arrow-heads in the diagram indicate the direction in which the line is traversed by the wrist-centre.

The curve-line has been drawn directly in front of the keys touched during the scale, though the centre of the wrist is not always actually in front of any key at the moment of that key's depression. This is the result of that outward pose of wrist spoken of before as favouring the passing underneath of the Thumb: Sec. 52 and 53. When the right-hand is in this outward position the wrist itself is really farther along in the direction of the top of the keyboard than the finger-tips are, and the line of the outside of the arm and that along the outside edge of the palm of the hand become more nearly a straight line; see "Die Deppe'sche Lehre des Klavierspiels" by both F. Klose, and E. Caland. A similar outward pose for the left-arm and hand is of course in the reverse direction: that is, in the direction towards the bottom of the keyboard.

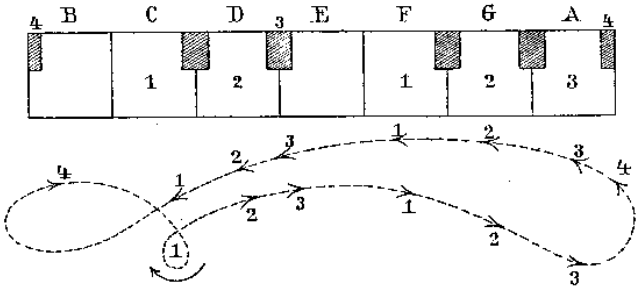
If the student will examine, in the diagram given above, the two curve-lines used in playing the portion of the scale from C upwards: 

he will notice that the underneath curve in the diagram is the upper-curve of a "reversed" ellipse, and that, before the descent of the scale is begun, this curve sweeps down and then round into the upper-curve of an ordinary ellipse. It is during this "sweep-round" of the curve that the extreme outer position of hand, wrist, and arm is entered and left.

The lower part of the scale: 

is played to the curve-lines of a reversed ellipse; though, as the student will understand, the lines do not here form a real ellipse.

In the one-octave scale of B♭ major or minor for the right-hand, the loop-note — C — is the second degree of the scale. The diagram of its curve-line will therefore be:



A comparison of the A♭ diagram with this of B♭ will show that the reversed curve at the beginning is smaller in the latter. There is thus less time in which to execute it. The loop also lies close to the bottom of the scale; and the proximity there of the two "twists" — the one a revolving motion, the other a rotary one — renders the lower portion of the B♭ scale unusually troublesome.

When the student has mastered the one-octave scales of A♭ and B♭ for the right-hand he will have no difficulty in playing with the same hand E♭ and C♯, both major and minor, and F♯ minor. In C♯ major a swift "sweep-round" will be needed at the top of the scale from the upper-curve of the reversed ellipse to the upper-curve of the ordinary ellipse. Let the student make sure that his upper-arm participates delicately in this movement.

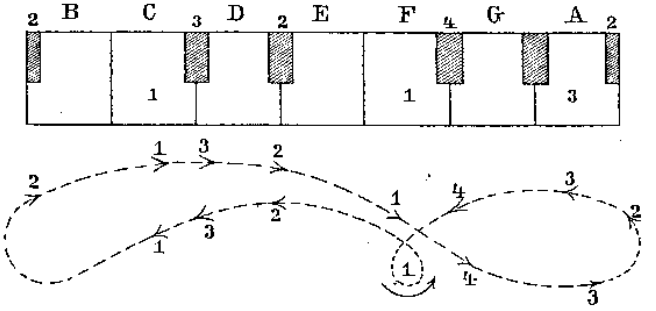
SECTION 58.

Ex. XLI. The left-hand one-octave scales beginning with a black key may now be studied. Of these there are six, namely, A♭ and F♯ major and minor, and B♭ and E♭

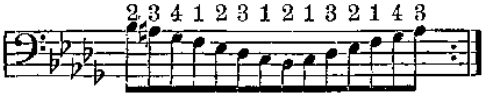
minor. All the conditions given for playing the right-hand one-octave scales apply equally to the left-hand scales.

The student had better begin with B♭ minor, as its loop-note — F — lies more nearly in the middle of the scale than the loop-note in any of the other scales. The E♭ minor scale — with its loop-note C♭ — may then be studied. After that may come the A♭ and F♯ major and minor scales. These last four have the loop-note at the top of the scale. The remarks made in the preceding section with regard to the one-octave scale of B♭ major and minor for the right-hand, where the loop-note was at the bottom of the scale, apply equally to these last four scales for the left-hand, in which the loop-note is at the t o p.

A diagram is here given of the l e f t - h a n d curve-line which the wrist-centre traverses in the one-octave scale of B♭ minor.



The notation of this is:



All the remarks made in Sec. 57 in connection with the scale-curve diagrams with regard to outer-position of wrist, ordinary and reversed ellipses, etc.. apply equally to the left-

hand scale and diagram given above. The student must remember that the upper part of the left-hand scale corresponds to the lower part of the right-hand scale.

The student, for the sake of the left-hand scale, must make an exhaustive study of the left-hand loop. This has been described in Sec. 53. To make himself master of the complex act of a fragmentary rotation of the fore-arm combined with a delicate revolution of the wrist-centre round an imaginary centre — both of these movements being involved in the making of the loop — he ought at first to practise both hands simultaneously for some time. This practice is done on any key held down continuously with the thumb: see end of Sec. 53.

When this has been made perfect he may then try the left-hand loop alone. Following this may come the practice of parallel-motion of the two wrist-centres; the combining of the loop in one hand with the two ellipses — ordinary and reversed — and the various figure-eights in the other; and also combining the loop in one hand with a free swing made by the other arm from one part of the keyboard to another. The student who has the will-power to withstand and overcome the peculiar nerve-irritation aroused by these muscular combinations will add greatly to the freedom of his technique. See Sec. 50, 51, 52 and 53.

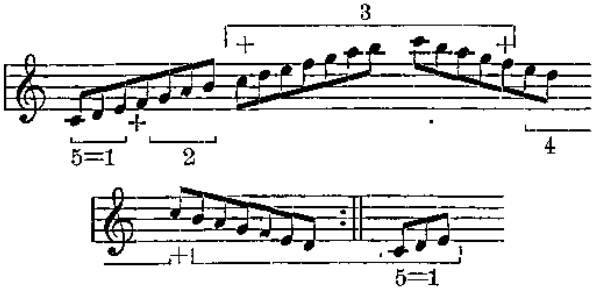
SECTION 59.

THE SCALE OF MORE THAN ONE OCTAVE.

The distinctive feature of the scale containing more than one octave is the use made of a Loop to connect note-patterns played to upper-curves of the ordinary ellipse while the right-hand is descending, and the left-hand ascending the scale. The Loop employed in Sec. 57 was that used to

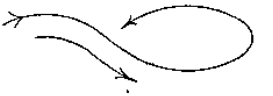
connect note-patterns in the right-hand a s c e n d i n g, and in the left d e s c e n d i n g.

Ex. XLII. In a two-octave scale — for either hand, when fingered like the scale of C — the Loop is used twice in ascending and twice in descending. In the following notation the Loop-notes are indicated by a cross.

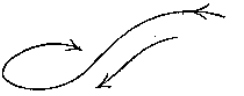


An analysis of the scale shows five note-patterns:

1. The first three notes of the above scale are played to the upper-curve of a "reversed" ellipse.
2. From the first F up to the first B is played to a similar upper-curve.
3. From the second C up to top C and down again to F — 12 notes in all — is played to a curve of the following pattern:

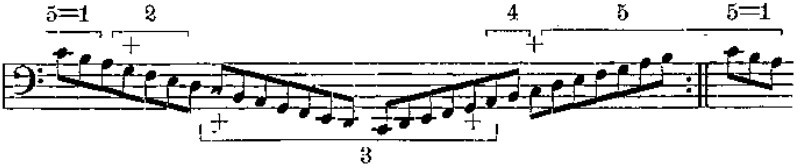


4. From E down to C is played to the upper-curve of an "ordinary" ellipse.
5. From B down to the bottom note of the scale and including two notes of the repeat — D and E — is played to a curve of the following pattern:

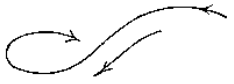


From the notation of the scale it will be seen that note-pattern No. 1 — containing the first three notes of the scale — is incomplete, and is the concluding curve of note-pattern No. 5. The student should refer to the remarks in Sec. 56 on starting in the "middle" of an ellipse or curve-figure.

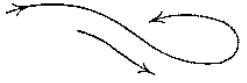
Ex. XLIII. An analysis of a scale for the left-hand corresponding to that in C major given above, is the following. The note-patterns are numbered, and the loop-notes are indicated by a cross.



1. The first three notes of the above scale are played to the upper-curve of a "reversed" ellipse.
2. From the first G down to the first D is played to a similar upper-curve.
3. From the second C down to bottom C and up again to G — 12 notes in all — is played to a curve of the following pattern:



4. From A up to C is played to the upper-curve of an "ordinary" ellipse.
5. From D up to the top note of the scale and including two notes of the repeat — B and A — is played to a curve of the following pattern:



With regard to scales for either hand, having three or four octaves, and with fingering similar to that of the scale of C, it must be remembered that for each octave added to the scale, two loop-notes in the ascent, and two in the descent make their appearance. Also, that in the three or four-octave scale the note-patterns at the top and bottom are played to curve-forms identical with those given for the C major illustration in this section.

The top and bottom of any scale having two or more octaves, and beginning with a black key, are played in the same manner as was demonstrated in Sec. 57 and 58 for the one-octave scale.

The student is advised to keep well in mind the remarks made in the last paragraphs of Sec. 53.

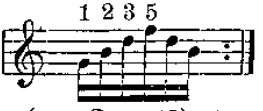
CHAPTER XIV.

THE ARPEGGIO.

SECTION 60.

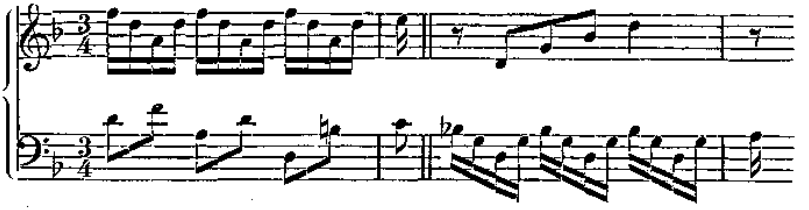
In Chapters IX., X., XI. and XII. several forms of the Arpeggio have been already illustrated. These were shown as fitted (1) by the ellipse divided equally, (2) by two curve-lines of unequal length, (3) by the ellipse with its curves traversed at dissimilar speed, and (4) by the Figure-eight. A separate Chapter is here devoted to the Arpeggio in order that some of its other forms may be brought under the student's notice. The fitting of curve-lines to these will give him no trouble if he has mastered all those described in the preceding chapters.

A survey of the Arpeggio as fitted by various kinds of curve-lines will now be taken.

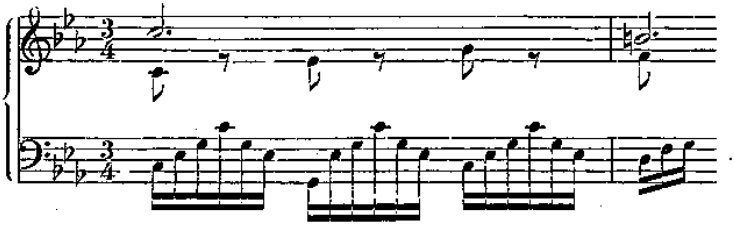
(1) With regard to the Arpeggio of the type which returns wholly upon itself, as 

, and is played with "regular" fingering (see Sec. 48) to an ellipse divided equally (see Sec. 43, par. 1), nothing further need be added to what has already been said in Chap. IX. about other note-patterns fingered on the same principle. The size of the Interval lying between contiguous notes constitutes the only important difference between the various patterns of this type. The following examples show this arpeggio: —

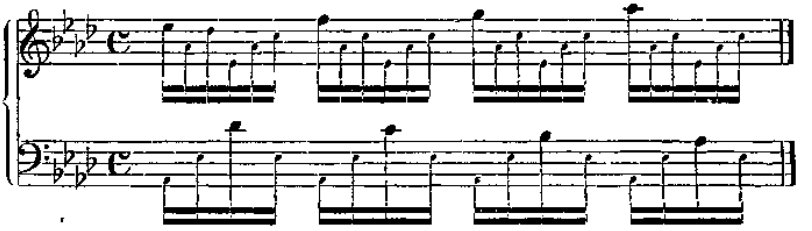
J. S. Bach: Prelude.



Beethoven: 32 Variations.



Chopin: Op. 25.

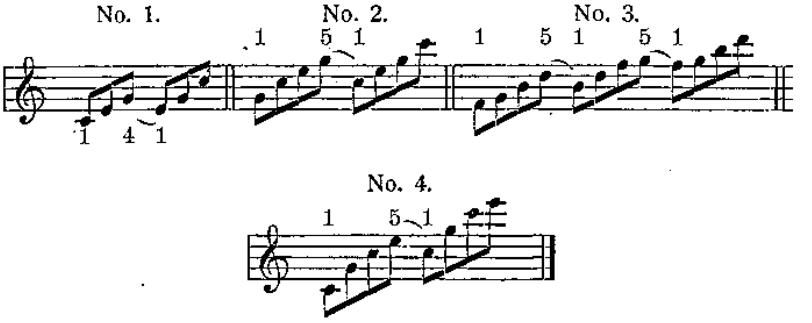


In the last example it is the left-hand note-patterns only which illustrate the type spoken of above.

In all of these arpeggios the "ordinary" ellipse is used: its upper-curve occurring when the order of fingering proceeds from a high to a low numbered finger — from 5 to 1 — its lower when that order is reversed. This applies to either hand.

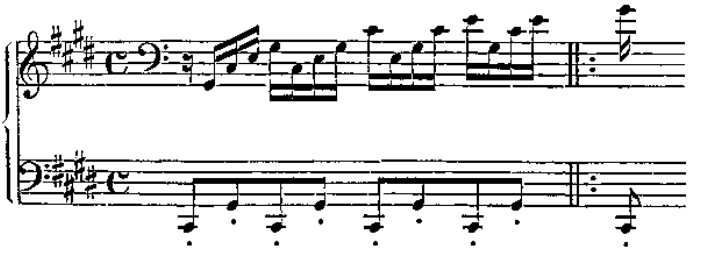
(2) A type of arpeggio commonly met with is that in which the two curve-lines fitted to the pattern are of unequal

length. In this type the arpeggio returns upon itself only partially. The following are examples:

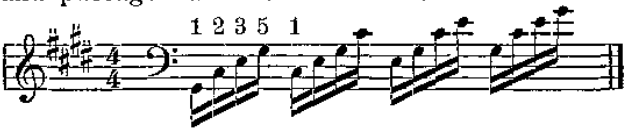


In each of these, the upper-curve of the "ordinary" ellipse occurs between fingers 4 and 1, or 5 and 1. The student will note that the interval from 4 or 5 forward to 1 is, in every case, less than the interval from that same 4 or 5 back to 1. The curve-line is accordingly shorter in the forward direction. This curve-line is therefore traversed more quickly than the lower one: See Sec. 47.

In Sec. 44, par. 1, it was said that some arpeggios form exceptions to the general rule that a low numbered finger starts the lower-curve of an "ordinary" ellipse. It will be found that when the last note of a note-pattern forms the first note of a group, as in the following example from Beethoven's Sonata, Op. 27, No. 2:



it is better to make the curve beginning with the low numbered finger the upper-curve of a "reversed" ellipse. If the above right-hand passage had been written so:



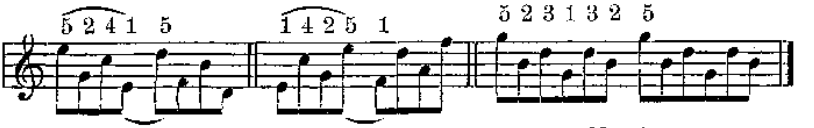
showing the end-note of the note-pattern as the end-note of a group, the first four notes would be played to the lower-curve of an "ordinary" ellipse: and similarly with the following note-patterns in the bar. But, in the passage quoted from Beethoven, the accent — mental or otherwise — comes on the last note of the pattern. Accordingly, as compared with the use of the "ordinary" ellipse, a better "throw"* of the hand and arm is obtained along the lower-curve of a "reversed" ellipse, namely, a throw from the last note of each note-pattern to the first note of the following one. The student should play the passage first with the ordinary and then with the reversed ellipse to convince himself of the difference between the two ways of distributing the arm-weight. The fact that that part of the palm of the hand next the wrist is removed from close proximity to the keys d u r i n g t h e l o n g e r c u r v e — the upper one — is of great importance.

When the accent comes on any other note of the pattern than the last one, the ordinary ellipse must be used.

(3) Another very usual type of arpeggio is that which — when returning on itself either wholly or only in part — is played by means of fingering proceeding i r r e g u l a r l y. (The explanation of the term "irregular" as applied to fingering, is given in Sec. 48, par. 1.) An example of this irregularity will be seen in the four r i g h t - h a n d note-patterns in the excerpt from Chopin given at No. 1 of this Section.

*) See Bandmann: "Gewichtstechnik."

(4) The following note-patterns show cases of irregularity of fingering, and also pairs of curves traversed at dissimilar speed.



No. 1. No. 2. No. 3.

In each of these examples — the notes in which are all of equal time-value — the comparative speed of the two curves in each pair of complementary ones may be determined if the student will count the number of notes lying between the extreme (limit) fingers: 5 and 1. Wherever these two fingers are contiguous the speedier of the two curves is played. See Ex. XXXI.

In both the first and second example, the slower curve comes first — between 5 and 1, and 1 and 5 respectively — and is followed by the speedier — between 1 and 5, and 5 and 1 respectively.

In example 1, the first curve, following the general rule — see Sec. 44 — will be an upper-one; in example 2, a lower.

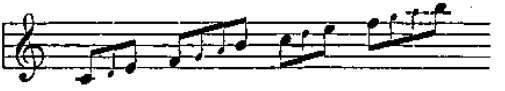
In the third example, the speed of the two curves is equal, seeing that the number of notes between 5 and 1 is the same as that between 1 and 5, namely, two.

(5) The Arpeggio when appearing as a note-pattern repeating itself in either the octave above or below, has already been spoken of in Sec. 54, Ex. XXXVII. In this case the type is that of two note-patterns in neighbouring octaves played to the Figure-eight curve-form. This does not need to be further explained.

With regard to the execution of the type sometimes known as the "grand" arpeggio — the "grandeur" consisting in its

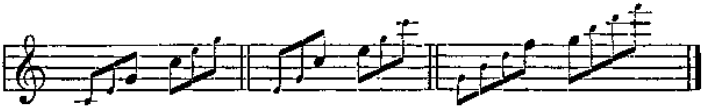
greater extension up and down the keyboard — little more need be added to what has already been said in Sec. 50, 51, 52, and 53.

The difference physically between what the hand feels while playing a scale and what it feels while playing an Arpeggio, is caused by its greater extension during the latter. In the scale, the interval lying between the limit fingers of each of the two note-patterns in any octave is that of either a third or a fourth:



and during neither is there any necessity for extension of the palm of the hand itself, or of the fingers.

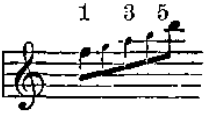
But in the Arpeggio, the width of the note-pattern is usually measured by an interval, between the limit-fingers, of a fifth, a sixth, or a seventh; as in No. 1, 2 and 3 respectively:



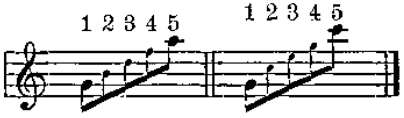
No. 1. No. 2. No. 3.

In addition to this greater width of the note-pattern, the interval between the loop-note — that played by the first finger — see Sec. 50 — and the note preceding it, is, in many cases, greater in the arpeggio than in the scale. In No. 1 of the above, this interval is a fourth; in No. 2, a third; and in No. 3, a second only.

And further: in a Scale, the succession of fingers 1, 2, 3, 4, 5 suggests a note-pattern such as

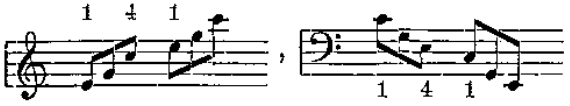


where the limit-fingers are a fifth apart. In an Arpeggio, the same fingering may be used for note-patterns of the following extension:

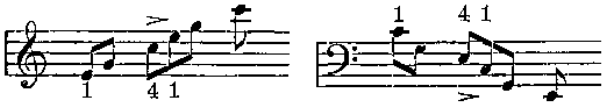


where neighbouring fingers have intervals of a third or a fourth between them. The power inherent in the Rolling-motion to undeceive the student as to the imaginary stretch-difficulties attendant on the execution of arpeggios such as the above, has been already touched upon in Sec. 44 and 46.

An important point noticed by Bandmann (Gewichts-technik, page 87) is, that in practising arpeggios such as

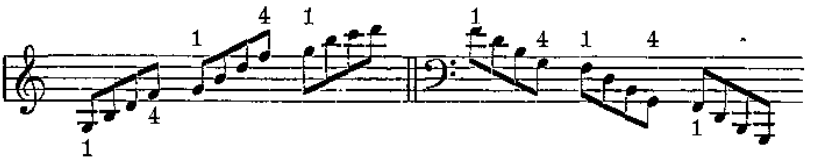


the accent should fall so:



: that is, on the finger immediately preceding the loop-note finger, and not on the loop-note finger — the thumb — itself. By this means, the weight of the arm is "thrown" naturally on to and through the weaker finger: thus avoiding loss of weight, and accordingly loss of equality of tone. This displacement of the accent will be used by the student as long only as there remains any tone-inequality in his execution of the arpeggio.

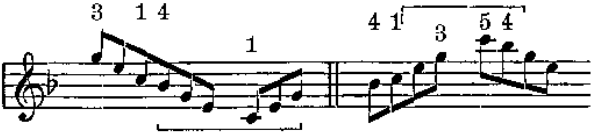
Ex. XLIV. In the arpeggio of more than two octaves, in the right-hand ascending, or the left hand descending,



the type of curve-line used in each of the note-patterns connected by the loop is, for either hand, the upper-curve of the "reversed" ellipse. If the connecting of the upper-curves described in Chap. XIII. has been thoroughly understood, the student will have little difficulty in mastering the looping together of these arpeggio-curves. The fact that they are larger than those employed in the scale makes no difference in the principle of their working.

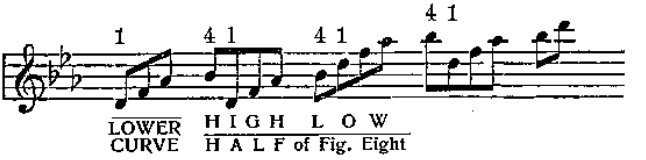
The arpeggio note-patterns for the right-hand descending and the left-hand ascending are played to upper-curves of the "ordinary" ellipse; that is, similarly to scale note-patterns for the same hands proceeding in a like direction.

In playing either end of the extended arpeggio, when the end returns upon itself, as:

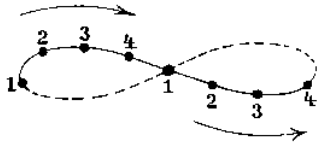


the same curve-treatment is used as was given for the top and bottom of the Scale (right and left-hand) described in Sec. 59.

In an arpeggio of the following type:



between its 4th and 5th notes — B♭ and D — and also between its 12th and 13th, the noteless half of the figure-eight (mentioned at the end of Sec. 56) must be employed.



For an arpeggio — up and down — of only two octaves, the complete figure-eight must be used. See Sec. 54, Ex. XXXVII, No. 3.

CHAPTER XV.

MUSCULAR-TENSION: FREE.

SECTION 61.

Of equal importance with the question of arm-rolling-motion in modern piano-playing is that of the muscular-tension of the back, chest, arm, and hand. To quote from Huxley's treatise previously mentioned, (Sec. 18): "A muscle has the peculiar property of changing its dimensions — shortening and becoming thick in proportion to its decrease in length — when influenced by the will, as well as by other causes called s t i m u l i, and of returning to its original form when let alone. This temporary change in the dimensions of a muscle, this shortening and becoming thick, is spoken of as its c o n t r a c t i o n. It is by reason of this property that muscular tissue becomes the great motor agent of the body; the muscles being so disposed between the systems of levers which support the body that their contraction necessitates the motion of one lever upon another. ..... The condition which ordinarily determines the contraction of a muscular fibre is, the passage along the nerve fibre which is in close anatomical connection with the muscular fibre, of a n e r v o u s i m p u l s e: that is, of a particular change in the substance of the nerve which is propagated from particle to particle along the fibre. The nerve fibre is thence called a m o t o r fibre; because, by its influence on a muscle, it becomes the indirect means of producing motion."

Along with this change of dimension, a muscle, when stimulated, changes also its Condition in the matter of con-

sistency: that is, its state of comparative hardness or softness. A knowledge of these muscular changes is of importance to the piano-student only in so far as it will help him to regulate the Consistency and Shape (or Mould) of hand — including the direction of the fingers — with such accuracy as will enable him to play the correct notes at the necessary instant, and with tone of the required volume. Without a correct Mould of hand and correct direction of the finger-tips, there can be no certainty: without the necessary tension — that is, hardening up of the muscles to a working consistency — the hand is unable either to withstand successfully the muscular shocks it receives during rapid and forceful playing, or to produce tone of sufficient sonority in rapid passages where little expenditure of energy is required.

SECTION 62.

The hand, in health, is capable of two extremes of muscular-tension, with all intermediate degrees. The one extreme may be experienced if the hand is laid in the lap, on its side, with the fingers limp and slightly bent. In this state, it is, as completely as the individual hand will admit of, flaccid, invertebrate, molluscous, b o n e l e s s. In the other extreme, when the muscles are stimulated to their utmost capacity, the hand is rigid: whether it be clenched into a fist, or half opened like a claw, or with the fingers fully stretched out.

But in piano-playing neither of these utmost extremes of tension is of use. In the former, the hand is not braced up to a tonicity sufficient to admit of the transmission, through the fingers, of an Impulse which will produce even a p i a n i s s i m o tone. In the latter extreme, the muscles are so strongly contracted as to induce inflexibility, to tire the hand, to deprive it of that delicate sensibility by means of which the player

can calculate the resistance of the keys, and to destroy the Balance of the arm.

The question then arises: What is the lowest and what the highest degree of muscular-tension the player may allow himself to use: How may he know which to choose and which to reject of the many grades lying between tension-extremes of such distance from each other: How may he learn to apply the exact amount of tension needed for each piano-passage he has to play?

But before the student is in a position (of training) to be able to make this selection for artistic purposes, he must first learn to control the muscles of his arm and hand when they are in the lowest state of tension in which tone can be produced from the piano. Gustav Stöwe, in his "Klaviertechnik," puts it thus paradoxically: "The first condition for the acquirement of a good technique is to be able to keep the muscles loose; the second is, to be able to keep them stiff." Breithaupt (Natürliche Klaviertechnik, Vol. II.) in speaking of "Fixation" — that controlled state in which, at the player's option, the muscles (and therefore the shape or mould of the hand and fingers) are f i x e d — says: "One must first acquire looseness and flexibility before proceeding to acquire the power of holding the joints firmly." This "fixation" of the joints, by means of muscular control, has already been mentioned in Ex. VI., Sec. 20, and in Sec. 25, in connection with the tracing of outlines by the arm. The use of the l o w e s t p r a c t i c a l degree of tension I have tried to teach in my book "Balance of Arm," in connection with the acquirement of Inhibition of unnecessary disturbing movements of the muscles controlling the fingers. In this lowest workable degree of tension, the arm itself — upper and lower — is kept s t i l l; and, accordingly, has the appearance of contributing nothing to the motion of the fingers. But this passivity of arm is only a seeming one: it is not absolute. "In the smallest

movements of any of the knuckle-joints, the muscles of the arm and shoulder participate. The smallest finger-movement affects the whole arm up to the shoulder." (Dr. Steinhausen: Klaviertechnik.)

SECTION 63.

Every piano teacher of experience must have observed that among his pupils no two have hands alike either in size or build. And also, that no two have hands with an exactly similar type of muscle-conformation. It is a matter of minor importance whether the length or girth of the bones of the hand be great or small, if neither of these qualities is unduly prominent. Neither the very big, nor the very tiny hand is the ideal one for the player. But it is of importance for him to have a hand well clothed with muscle. And also to have the muscles under such control that they can become, at will, either soft and "fleshy," or be braced up to a firm unyielding consistency. And the most complete muscular training the student can receive is that which gives him the control that will allow him at any moment during performance to induce and retain whatever degree of tension he may wish. This control of the tension he must now study to acquire.

All the exercises given here for the cultivation of the stretch of the palm, and the retention of the hand in any desired shape or mould — "fixation" — must be practised very gently. The student must not hurry matters, and thus run the risk of overstraining the muscles. He must remember that the hand can only gradually become accustomed to hold itself without danger in these moulds, either when it is free — that is, away from the keyboard — or when it is acting with more or less energy on the keys, and is therefore receiving shocks communicated to it by the resistance of the keys. This ability of the hand itself, when swung by

the arm from place to place on the keyboard, either to retain any mould, or, during the swing, to change from one mould to another with precision, is a necessity of piano-playing, and one to which the student must devote his closest thought. This will be referred to later on: Sec. 75.

SECTION 64.

Ex. XLV. Stand erect, keeping the shoulders well down, the chest up, and the arms hanging loosely. Bend the right fore-arm till it makes a right angle with the line of the upper-arm, and place the open palm of the right-hand loosely against the front of the body, keeping both the fore- and upper-arm touching the body. Supinate the hand — thus removing it from contact with the body — and keep it from falling backwards at the wrist. Very gently stretch (and thereby broaden) the palm of the hand, making it at the same time slightly concave. Curve the fingers, and make the tip of the thumb, by bending at the nail-joint alone, point a little inwards. The whole hand is now in a somewhat tense condition

The first part of the exercise consists in alternately assuming this shape of hand and condition of tension, and then relaxing the whole hand to its softest muscular condition, without letting it fall back at the wrist at the moment when the muscles are relaxed. Preserve the tense condition for the duration of one second, and relax for the following two. At the moment of relaxing, the whole hand collapses, though the wrist must be gently "braced" to keep the hand from falling backwards. The student is again earnestly warned against urging the hand-tension to its utmost limit during these exercises. The hands must be drilled alternately, one hand being exercised at first not more than eight or ten times before going on to the other. The greatest mistake the student can make is to imagine that his

hand is strong because he can make it feel "tight." Therefore, let him use extreme caution — especially at first.

Ex. XLVI. This exercise is meant to accustom the hands to resist pressure brought to bear on each finger in turn.

Place the right arm and hand in the position used for the preceding exercise, and then induce the same gentle tension of the muscles. Double up the left hand into a fist, with the thumb outside, and then extend its fifth-finger straight. With the tip of this straight finger push g e n t l y against the fleshy part of each finger-tip of the right hand. The resistance of the one hand to the other must be so nicely adjusted that the curved fingers of the one hand do not "give" to the gentle push of the fifth-finger of the other. The push should be neither sudden nor jerky, and must be of only momentary duration, lasting not so long as a second of time. A rest for both hands should be taken after every ten pushes: that is, after the curved fingers have been gone round twice. The use of the extended f i f t h-finger while pushing against the resistance offered by the fingers of the other hand will gradually strengthen the muscles lying on that side — the fifth-finger side — the outer edge — of the palm. The part played by these outside muscles of the palm in the execution of rapid octave-passages, the tremolo, etc., will be noticed later on: Sec. 73.

While the fingers are being pushed against, the nail-phalanges must not be allowed to bend backwards. This tendency is likely to occur in hands with l o o s e l y j o i n t e d fingers. It is occasionally seen also at the middle joint of the thumb: that is, the joint between the wrist and the nail-joint; and when a hand with this tendency is playing on the piano, the middle joint of the thumb often disappears beneath the palm of the hand. In this case, the muscular-tension of

the hand is misplaced and misapplied, becoming a source of weakness instead of strength. The student whose hand has this unfortunate habit must make up his mind to conquer it. The two preceding exercises will initiate the early stages of this victory if they are carefully worked at: the first exercise teaching the middle thumb-joint to remain in its correct attitude towards the other parts of the hand — the second accustoming it to maintain this attitude while successfully resisting pressure. The preserving of this attitude while playing on the piano, that is, while meeting and overcoming the resistance of the keys, will be referred to later on: Sec. 69.

As a rest for the hand after being kept in a state of tension, the gentle opening and shutting of the fingers will be found effectual. When the hand is gently closed the thumb should be outside of the fingers.

SECTION 65.

Another weakness frequently met with is one connected with the muscles on the fifth-finger side — the outer edge — of the palm. When the fingers are placed on five neighbouring white keys — the latter at high-level — the knuckles of the fourth and fifth-finger of some hands are seen to sink somewhat lower than those of the first and second-finger. The student in this case has not, as yet, sufficient muscular control to prevent the two o u t s i d e knuckles from sinking. Some writers recommend that the back of the hand, at the line across the knuckles, should be held a little higher up from the keys on its fifth-finger side than on its second. This, however, unless the elbow be kept at a considerable distance out from the body, demands a forced pronation of the hand. And this extreme pronation may be avoided if the student will work at the following exercise.

Ex. XLVII. Lay the open palm and fingers of the right-hand flat on a table, the fingers straight out and touching each other, and the line of the outside (fifth-finger) edge of the palm making a straight line with the outside line of the fore-arm. With the hand fixed in this pose, remove it from the table, and bringing the elbow close to the body, keeping the back of the hand facing upwards, and the second, third, fourth, and fifth-fingers quite straight and close together, bend them at their knuckle-joints until the line along all the straight fingers and the line along the back of the hand make nearly — not quite — a right angle. Steady the hand by placing the inside of the nail-joint of the thumb against the side of the middle joint of the second-finger. The line along the back of the hand and that along the fore-arm must make a straight line, and the hand at the wrist-joint must not be allowed to move. It is hoped that these directions may be clearly understood, as they indicate the necessary pose of hand in which the exercise is to be practised.

With the hand and fingers in this angular pose, and keeping the thumb and the first and second-finger knuckles quite still, endeavour to move the knuckles of the fourth and fifth-fingers up and down. In doing so, the side of the straight fourth-finger will slide a little along the side of the straight third, and the tip of the fourth will then extend probably a little further out (down) than the tip of the longer third-finger. This is, however, a matter decided by the relative length of these two fingers.

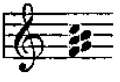
This sliding-up-and-down movement is, for some hands, found to be at first impossible — even for loosely jointed ones. When this is so, a little "prompting" with the other hand will be necessary. This may be done by pushing gently against the knuckle of the right-hand fifth-finger, from above and from underneath, with a finger of the other hand. It is

usually found that the two knuckles — the fourth and fifth — after a little while are able to move up and down without assistance from the other hand. When this is accomplished in even a small degree, the student has made an important step forward. He must then continue this now unprompted up-and-down practice until he can make the movement fairly quickly. After this he must practise it with the hand supinated — that is, with the back of the hand facing downwards. The drill for the left hand must not be forgotten.

SECTION 66.

The following exercise is for controlling the tension of the muscles of the shoulder, chest, and back. It is a preparatory training for such pieces as Liszt's arrangement of Schubert's "Erlkönig," his 6th Rhapsody, and for all rapid octave and chord-playing.

Ex. XLVIII. Sitting at the piano on a seat the height of which, when the hands are on the keys, causes the line of the arm from the elbow to the wrist to slope up a little, keep the chest well out and the shoulders down. Place the ten fingers on the notes

L. H.  and R. H. 

and — with the arm balanced — keep them lying on these keys at high-level throughout the exercise. Count slowly, 1 — 2 — 3 — 4. At 1, bring both elbows close to the body. (To do this it will not be possible to make them touch the sides of the body: they must be brought rather more to the front). Press the elbows when in this position fairly tightly against the body for a moment. While this momentary pressure lasts do not allow the fore-arm to get out of balance, nor the wrist to become stiff: the fingers must not be allowed

to press tightly on the keys. At 2, remove the elbows to a little distance from the body, at the same time completely relaxing the arm, shoulder, and chest tension. At 3 and 4, rest the arms in this "hanging" pose, keeping the chest still well out, and breathing naturally.

When the student has become accustomed to the nature of this exercise and can do it without fatigue, he may then vary the exercise by giving greater duration to the pressure-moment and less to the relaxation. This may be done at first by keeping up the pressure during beat 1 and 2, and relaxing during 3 and 4; and then by pressing during 1, 2, and 3, and relaxing during the fourth beat only. All this must of course be proportioned to the natural strength and power of endurance possessed by the student. If his hand happen to be rather loosely built or his bodily physique spare, he should continue working gently at the previous exercises in this chapter until he has partially hardened himself up, before trying his tension against the resistance of the keys.

Ex. XLIX. The most difficult and exhausting form of the preceding tension-exercise is the following. Lay the fingers on the same ten keys at high-level, and press the elbows against the body in the manner above described. Let the student now fix his mind intently on the peculiar physical feeling caused by the tension along the upper-arm and around the shoulders. Steadily preserve this same feeling of tension, and at the same time, withdraw the elbows an inch or two from the body. It will be found difficult at first to preserve the shoulder-tension unrelaxed while the elbows are removed from the body. A little practice will enable the student to overcome this difficulty.

After this has been accomplished, the hands, with all the fingers kept on the keys at high-level, must then be slowly moved away from each other up and down the keyboard,

the shoulder-tension being still preserved. Both hands should at first move in contrary-motion up and down an octave from their original position a good many times; and then farther and farther apart from each other, until they approach the extreme limits of the keyboard. To do this the arms must of course leave the sides. The arms may then be exercised moving up and down the keyboard in parallel-motion, keeping sometimes the same distance from each other, and sometimes widening or narrowing the distance between them.

Another test of tension-control may be had if the student will, with the finger-tips on the keys, run the right-hand up and down the keyboard while keeping the right-shoulder tense, and at the same time swing the hanging left-arm backwards and forwards with the left-shoulder fully relaxed. The converse of this treatment of the arms must also be practised.

Should the student be curious to see some interesting Röntgen-ray illustrations of the shoulder-blade when controlled by this muscular tension let him consult "Die Ausnützung der Kraftquellen beim Klavierspiel," by Elisabeth Caland; Stuttgart, 1905.

SECTION 67.

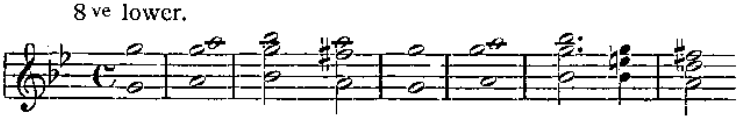
In Sec. 11, following the table of Activities and Passivities, mention was made of the three great arm-movements used in piano-playing, -namely, ROLLING, SWINGING, and VIBRATING. In Steinhausen's "Klaviertechnik," Bandmann's "Gewichtstechnik," Breithaupt's "Die Grundlagen der Klaviertechnik," and in my own book "Balance of Arm" will be found explanations of the principles of the swinging-movement of the arm, and suggestions as to how to acquire it.

Before beginning any consideration of the arm's Vibratory movement, it will be necessary to notice a certain peculiarity

in the "action" of the pianoforte. It was mentioned in Sec. 2 that if a finger be placed on the surface of any undepressed key and very swiftly drawn inwards into the palm of the hand — depressing the key by means of the jerk — the key itself will swiftly rise to its high-level. If an experiment be made with the key, it will be found that, in order to produce tone from the piano, it is not necessary to begin the downward motion from the key's very highest level — that is, the level at which its surface is "flush" with the other high-level key-surfaces. It will be found, if the finger be placed on the key-surface at high-level, the key be first moved cautiously down to a very little lower than that level, and the finger then jerked swiftly down to low-level, that tone may still be produced. It will also be found possible to produce a succession of tones from any one key if the finger, in letting the key rise for the following tone, do so in close contact with the key-surface, stop rising when the key has reached the same nearly highest level, and then, from there, again depress the key. From this it will be seen that, in repeating any note, it is not necessary to let the key rise each time to its quite highest level. A certain saving is thus effected.

An idea of what this is may be gathered from the following calculation in connection with the playing of Liszt's arrangement of Schubert's "Erlkönig." A key during its depression from high to low-level sinks about three-eighths of an inch: and to regain high-level it must rise the same distance — in all, three quarters of an inch for the double journey. We will suppose the amount of lineal measure saved by descending from only nearly high-level as compared with from quite high-level, to be one-sixteenth of an inch: and the same amount in its ascent; in all, one-eighth of an inch saved every time the key goes from and returns to nearly high-level – that is, on the double journey.

At the beginning of the above-mentioned arrangement by Liszt there are $14^1/_2$ bars of repeated notes: each bar containing 12 repetitions — making in all 174 repetitions to be played before the voice-part enters. During the $14^1/_2$ bars the hand-position (note-pattern) is changed 8 times:



and accordingly, the last note of one position and the first note of the next will be played respectively by a full up-coming and a full down-going of the key. This — including the first note of the first bar — gives a total of 17 cases in which a rise and fall of eleven-sixteenths of an inch must be used. But 17 from 174 — the complete number of repetitions leaves 157, which is the number of times in the $14^1/_2$ bars that a rise (or fall) of only five-sixteenths of an inch is required: or, in other words, a rise and fall of five-eighths of an inch. 157 times five-eighths is $98^1/_8$ inches: 17 times eleven-sixteenths of an inch is $11^{11}/_{16}$ inches. And these two amounts added together make $109^{13}/_{16}$ inches. But the whole 174 notes at six-eighths of an inch would be $130^1/_2$ inches. And $109^{13}/_{16}$ inches from $130^1/_2$ inches leaves $20^{11}/_{16}$ inches, or 1 foot $8^{11}/_{16}$ inches, which is the saving in length effected in the $14^1/_2$ bars by using, during the repetitions, the nearly high instead of the quite high-level of the key. And this saving in length means a saving of time. A higher speed is therefore possible.

SECTION 68.

The student will note that, in order to make these calculations of any practical value, be must learn to keep the

key "in check," and prevent it, at each repetition, from returning to its full high-level.

Ex. L. This will be better understood after the following experiment has been made. Lay across the keys, a little way back from their front edge, any fairly solid article — such as a flat-sided penknife — and let it lie across not less than three white keys. Lay a finger-tip on the middle one of these three, and jerk this key down by drawing the finger into the palm of the hand. The key, springing up quickly, will "click" against the penknife if the under surface of the latter and the surface of the keys are in the same plane. The click proves that the key rose to high-level.

Now, on the same key, with the same finger, and keeping finger-tip and key-surface in constant contact, play a succession of repeated notes at the rate of four to one second. The click each time the key rises will still be heard, proving that the key is not being kept "in check."

Finally, let the student endeavour to comply with the following conditions. Double up the right-hand fairly tightly into a fist, and then extend the first (thumb) and second-fingers. Press the thumb against the inner side of the nail-joint of the second-finger, and hold the latter as straight as possible and quite stiff. The whole hand must be kept firm and unyielding. Place the tip of the stiffly held second-finger on the key experimented with above, and try to execute a series of repeated notes at the rate of six to one second. This speed may be attained by making the whole arm vibrate, apparently, in one piece. In order to accomplish this arm-vibration, muscles of the back, chest, shoulder, and upper-arm must be pretty firmly contracted or stimulated. An attempt to describe this condition of tension has been made in Sec. 66 Ex. XLIX. The shoulder is brought a little down, and also a little forward; and the muscles of the upper-arm, shoulder,

and back feel as if they were firmly held. The whole arm exhibits, during the act of vibrating, a rapid trembling or quivering movement.*)

The finger — as the final or end-portion of this quivering body — is then applied to the surface of the key, and the latter is made to quiver up and down in direct obedience to each vibration of the arm, and in constant contact with the finger-tip.

The student may have to try this rapid nervous movement a few times before he becomes so far master of the key as to compel it, at each vibration, to retrace its steps before it reaches quite high-level. Whenever he can do this, the clicking of the key-surface against the penknife will stop, and the speed of the repetition will increase.

If the student, after he is able to hold the key "in check," wishes to prove the indispensability, in rapid repetition-work, of the firm tension of the whole limb, let him try the vibrating process with a loose hand and finger. He will find that the high speed immediately vanishes, and the clicks recommence. The hand and arm must therefore be kept in a high state of muscular-tension before they can with ease and neatness execute rapid staccato, octave, and chord repetition-passages; and a study may now be made of the application of energy to the keyboard with the muscles in that condition. But let the student continually bear in mind that the nerve-strain which this entails must be neither pushed momentarily to its extreme, nor continued too long at a time. Therefore: FREQUENT RESTS.

*) See "Ausnützung der Kraftquellen beim Klavierspiel," by E. CALAND.

CHAPTER XVI.

MUSCULAR-TENSION: APPLIED.

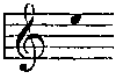
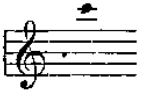
SECTION 69.

In learning to apply a tense hand to the keys for the production of tone, the student must remember that although it is mostly in passages where a higher degree of speed is necessary that the higher grades of tension are employed, yet it is not for staccato-playing or repetition-passages alone that these grades are essential. Some of them are necessary also for the smooth rolling-along and the controlled distribution of arm-weight productive of legato-tone — (so far as any r e a l l e g a t o is possible for the piano) — and also for the type of tone which, from its having an intermittent quality and being more palpably percussive, is called non-legato. But it will be advisable for the student to begin the practice of these grades of muscular-tension using the s t a c c a t o - t o u c h, as it is then that they are most thoroughly learned. A very helpful guide in this matter may be found in the appendix (with an English translation) to "Ludwig Deppe's Fünffinger-übungen," written by Elisabeth Caland; Stuttgart, 1900.

I will take it for granted that the student, before going on to the following exercises, has drilled his hand to the extent that he can retain it in the pose described in Ex. XLV., Sec. 64; that he has developed as much muscular control as enables him to keep the knuckles of the fourth and fifth-fingers in line with those of the second and third; and that he is now able to stimulate muscles of the upper-arm, shoulder, back, and chest to such a degree as will keep the key "in

check," as described in the preceding section. If he has not yet accomplished this he will be unable to derive full benefit from the following exercises.

SECTION 70.

Ex. LI. The student will begin learning to apply hand-tension to the keys by playing, with the thumb, any white key a good number of times. The position of this key should be — for preliminary study — about an octave above middle D for the right-hand, and the same distance below for the left. The thumb must keep its nail-phalange in a straight line with the key used. This will necessitate a slight bend (crook) at the nail-joint whereby the tip of the thumb is made to point towards the hand. This slight bend inwards, while furthering an exact placing of the tip of the thumb on the key, that is, equidistant from the sides of the key, — thus helping to avoid wrong notes as well as faulty attack when approaching the keys on the swing — will automatically keep the tension of the thumbside of the hand in good order. The whole hand while working at these preliminary exercises must be opened out as if for the stretch of a sixth. Thus, if the thumb is repeating the note  the fifth finger will be held over (though not touching)  and remain so during the drill for the thumb. Large hands may open out to the octave-span. As long as the hand is in either of these stretch-widths the line across the back of the hand at the knuckles must, for the sake of the tension, and therefore eventually, of the tone, be held in correct pose. Accordingly, the knuckles of the fourth and fifth-fingers must not be allowed to sink in, that is, down towards the keys. If they do, the tension is wrong.

The drill to be used by the student must first be a repetition many times of the same note. This must be done at first not with the rapidity of vibration described in the fourth paragraph of Sec. 68, but at the rate of two repetitions a second.

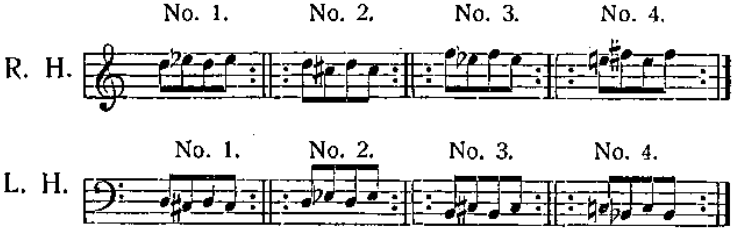
When the thumb has had its share of the drill and the student has then rested a little while, he must exercise the second-finger in a similar fashion. The hand must still be held in the spread attitude mentioned above. This keeping of the whole hand opened out is at first tiring.

The third, fourth, and fifth fingers must then be similarly treated: always with the opened-out hand. Care must be taken that the tension of the fingers be not relaxed. Down to the nail-joint each finger must have the feeling that it is being moved in one piece — as if jointlessly.

SECTION 71.

When the student is able to keep his hand in the necessary steady fixed tension while playing a repeated note at the above-mentioned speed with any finger, he must then go on to exercises in which other arm-movements in addition to (simultaneously with) the Vibratory are used, namely, the Forward and Backward. Perhaps the simplest exercises in which he can employ those movements are the following one-finger examples:

Ex. LII.



In these, a gentle sideward (or diagonal) movement is included. The latter necessarily is combined with the other movements whenever the succession of notes played is not the same note repeated.

The exercises, practised firstly with each hand separately, must be played always with only one finger — not with two, as their appearance would seem to indicate; and each of the five fingers must in turn get its share of the drill. The hand must throughout be kept tense and extended.

The student, while the finger is travelling from a white key to a black and back again, must try to touch a spot on the one key as near as possible to the spot touched on the other: in other words, the distance from the spot touched on the white key to that touched on the black must be made as short as possible. This economy of Line-distance means an economy of Time-distance: accordingly, an increase of speed.

When the student has practised the exercises for some time with separate hands he must then work at them with both simultaneously: and firstly, in contrary-motion, using, for both hands, each pair of the similarly-numbered examples.

After this, he must work them in parallel motion. To do so, any two examples in which the notes proceed in the same direction may be combined for two-handed practice. Thus:

No. 1 for the right hand may
be played with either 2 or 3 in the left
No. 2 „ „ „ „ 1 or 4 „ „ „
No. 3 „ „ „ „ 1 or 4 „ „ „
No. 4 „ „ „ „ 2 or 3 „ „ „

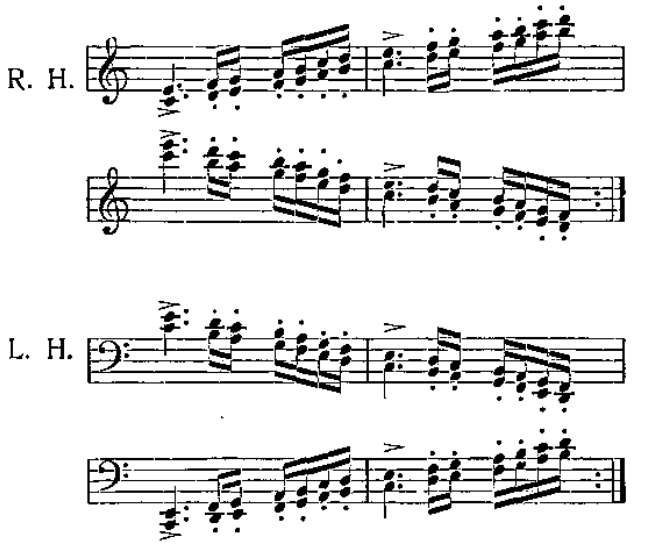
The greater difficulty of the parallel as compared with the contrary-motion practice will at once be felt.

Material for single-finger practice of staccato-touch is practically unlimited, and may be found in any manual of piano-technique. The student has only to use all exercises

written primarily for legato-practice, and employ the staccato-touch instead. Two-, three-, four-, and five-finger exercises of every form — played of course with a single finger — as well as scales, arpeggios, and arm-springs of various extension, may all be worked at with benefit.

SECTION 72.

Ex. LIII. Following on this one-finger staccato-practice may come the use of two fingers simultaneously; the material used being the scale of C major in thirds.



This scale must be practised with the following ten fingerings, each of which induces a difference of hand-tension, and therefore makes a fresh experience for the student.

For the right-hand Scale.

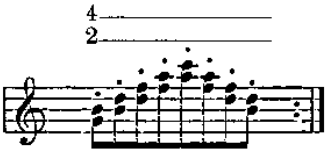
2	3	4	5	3	4	5	4	5	5	must in turn
1;	2;	3;	4;	1;	2;	3;	1;	2;	1	be used.

For the left-hand Scale.

1 2 3 4 1 2 3 1 2 1
2; 3; 4; 5; 3; 4; 5; 4; 5; 5.

While using any of these fingerings the hand must constantly be kept in a firm state of tension. But how firm that tension must be cannot be stated exactly. To discover this, the student must be continually experimenting with his hand and arm. Too much tension will make the muscles so rigid that the speed of the passage will be impaired. Therefore he must temper his enthusiasm with common-sense. Too little tension will also prevent speed by rendering the hand itself too independent of the arm. In this state the hand feels heavy and lumbering. The amount of tension is therefore a matter individual to the student. The final umpire is the trained ear.

It will be noted that, in the scale given above, the first note of each bar is a dotted crotchet accented. The student must give this note its full value, and then make a light rush to the first note of the next bar, keeping this next-bar note well in mind during the semiquaver portion of the bar. During the rush up or down the keyboard, the action (on the arm) of the shoulder-muscles must be carefully attended to. The movement there must be finely controlled and graded. If this grading is irregular, wrong notes will be the result, seeing that in the scale of C major the distance from key to key is always the same. The same guiding principle would be adopted in such a passage as the following: —



The shoulder-movement finds the correct keys for the fixed finger-tips, and the brain regulates the motion of the shoulder. But an adequate arm-hand-and-wrist-tension is indispensable also.

Ex. LIV. The student will go on now to the scale of C major in sixths, playing it with the same rhythm as was used for the scale in thirds.

In ferreting out the best grade of tension for these two scales it will be found that some of the playing fingers have occasionally to adopt an almost straight attitude, thus raising the palm of the hand at the knuckle-joints a little higher than usual above the level of the keys. This is sometimes the case with the fifth-finger, a profile view of which will show an angular pose of hand. But if the student has hit upon the degree of tension which enables him to get the desired tone and speed, he may very well afford to disregard any transient odd hand-shape: see Sec. 74, par. 1.

SECTION 73.

The student has now been led up to the study of that branch of piano-technique which may be called the goal of all ambitious players, namely, rapid octave-playing. The chief cause of the failure of many earnest players ever to surmount the difficulties of rapid octave-playing is that, while practising this, they insist on trying to make the hand itself work too independently of the arm: they use tension at the wrong place. To quote from the valuable remarks on octave-practice by Caland mentioned before, Sec. 69, "The playing-from-the-wrist which is prescribed in most piano-methods, exacts a pronounced raising back of the hand at the wrist — a movement which has its origin in a powerful contraction of the upper-muscles of the fore-arm. In consequence, this part of the fore-arm becomes highly developed, but it is

at the cost of proportionate weakness of the upper-arm. This activity of the wrong muscles has also another unfortunate result, for thereby the hand is rendered heavy, and the desirable and requisite "feather-lightness" becomes impossible of attainment — a state of things which goes far to account for the fact that so many piano-students can never satisfactorily execute rapid octave-passages . . . . . To acquire by the most direct method the rapid execution of octaves it is essential that the wrist shall be maintained in the highest state of firm, yet always elastic, tension, and that there shall be transmitted to the hand — by means of a movement which takes its rise in the shoulder and travels down the arm — a motion which shall cause it to vibrate rapidly . . . . . Every observer who is not the victim of an optical delusion, will have noticed that the rapid octave-playing of the great artists rests on the above basis."

But in order to enable the Hand itself to receive the vibratory movement passed down from the shoulder and arm, and, then to transfer this movement to the keys and make them vibrate at the requisite speed, the individual build of the parts of the Hand and their capacity for tension must be carefully studied. The breadth of the palm, the length of the fingers, as well as the firmness or looseness with which these are attached to the palm, have all to be taken into consideration, seeing that one physical item overlooked or unconsidered is enough to mar the tonal effect of any passage.

It will conduce to the preserving of a hopeful confidence in the student's mind if, so long as any octave-passage fails of its complete tonal effect, he will attribute that failure to the fact that, either he has not spotted the very part of his hand at which the tension is inadequate, or that the guiding action of the shoulder-muscles is not properly controlled: Sec. 72.

A short summary of the various portions of the hand with regard to the special tension necessary for them in octave-playing is given in Sec. 74.

Ex. LV. The exercises for the practice of octave-playing are the same as those recommended in Sec. 71, Ex. LII., for one-finger staccato. Special attention must be given to the practice of the "repeated note" octave, examples of which are found in Liszt's arrangement of Schubert's "Erlkönig," his 6th Rhapsodie Hongroise, his "Rigoletto" Fantasia, and in Rubinstein's Staccato Study in C. Other examples of repeated-note work requiring a high grade of tension are Heller's "La Chasse," and the Study in C minor, Op. 52, of Saint-Saëns.

SECTION 74.

In presenting the tension-analysis of the hand it will be best to examine separately the two parts into which the latter naturally divides itself, namely, the Palm and the Fingers. And as the former is, as regards octave-playing, the more important, it will be noticed first.

In looking at the palm of the hand opened out, the lines (roughly speaking) of a square may be discerned: — its four sides being (1) the knuckle-side, (2) the fifth-finger side, (3) the wrist-side, and (4) the thumb-side. The tension of each of these will be noticed separately. The corners of the square — these being the second-finger knuckle, the fifth-finger knuckle, and the two outside "edges" of the wrist — may each be considered as belonging to two sides of the palm.

1. As regards the knuckle-side of this palm-square, any deficiency of tension there will probably be found located at the fourth and fifth-finger knuckles. This deficiency may be supplied if the student will work carefully at Ex. XLVII., Sec. 65. These two knuckles are, in octave-playing, kept firmly braced, as well as level with those of the second and

third fingers, by means of the tension of muscles lying along the fifth-finger side of the palm, and along the fore-arm.

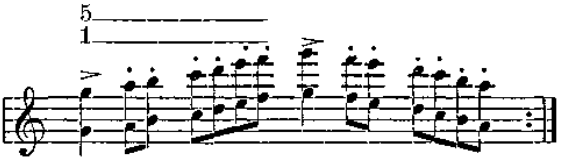
In connection with the knuckle-side of the palm-square, the attitude of the three inner fingers — the 2nd, 3rd, and 4th — must be noticed. When the hand is braced for the octave-span it is possible to pose these three fingers in various ways. They may be kept tightly tucked in, or moderately bent, or quite straight; and they may also be held all three touching each other, or two touching and one separated, or all three apart. But no one particular attitude can be considered "correct" for every student. How the fingers ought to be posed must depend altogether on the natural tension of the hand; and every pose possible to these fingers must be tried until one is found that will allow the vibrations of the arm to permeate every portion of the hand down to the finger-tips.

2. The fifth-finger side of the palm. In addition to its own muscles — see Sec. 65 — those of the upper-arm assist materially in keeping this side of the hand firm; and this invaluable backing-up of the hand-tension must be now specially studied.

Ex. LVI. The act of stimulating or innervating the upper-arm muscles should be practised daily in the following manner. Keep the chest well out and the shoulders down. Interlock the fingers of both hands in front of the body as lightly as possible. During the exercise try to keep the fingers from tightening their hold on each other. If this tightening or grasping takes place, wrong muscles in the fore-arm will be contracted. Try, by intensity of thought and strength of will, to stimulate the muscles of the upper-arm. The strong mental effort directed towards these muscles will cause a co-stimulation of certain muscles of the fore-arm, chest, and back. But the feeling of stimulation lies chiefly in the upper-arm.

3. The wrist-side of the palm-square is probably the one most likely to be forgotten during octave-playing. The student must remember that this side must always be kept at "full breadth." To allow the tension of that side of the square lying nearest the arm to become relaxed in any degree, would be — in an equal degree — to prevent the vibratory motion of the arm from finding its way into the body of the hand, and through that to the finger-tips. The well-braced wrist is thus indispensable in rapid octave-playing.

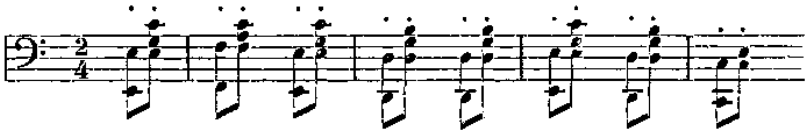
4. The thumb-side of the palm-square has already been spoken of: Sec. 70. In keeping up a workable tension here, the crook of the nail-joint is of importance. It not only automatically furnishes the hand with a considerable degree of tension, but it also promotes "cleanness" of touch. If the hand is large enough to allow the nail-phalange of the thumb, during octave-playing, to be held in a nearly straight line with the line of the keys, the tip of the thumb will more easily get into the middle of its own key: that is, to a spot on that key equidistant from the edge of the key on either side. It will thus be in a position to avoid touching two keys instead of one. This fault is shown by the finger in two ways. Firstly, either — while playing its own key — in lightly touching a neighbouring key, although without "sounding" it; or, secondly, — while playing its own key — in simultaneously causing a neighbouring key to sound. This untidiness of touch is, in the former case, generally considered excusable, seeing that it may bring with it no wrong notes. For some hands this untidiness may be unavoidable on account of their limited width and stretch, which renders any crook of the thumb impossible. But for hands capable of an easy stretch, a more rigorous criticism is advisable. In a passage such as the following:



if the tip of the thumb or of the fifth-finger should come into contact with the s i d e of any key, a certain hindrance to the easy progress of the hand up or down the keyboard, as well as "into" and "out of" each key, would necessarily arise. To prevent this, the student must keep the tension of the hand so firm that the distance between the tip of the thumb and that of the fifth-finger may remain unaltered. The action and tension of the shoulder-muscles also must be absolutely steady while they are bearing the arm up and down the keyboard. If this is not so, miscalculation of the distance from key to key will be the result.

This fixity of distance between the tips of the two outside fingers must become a "physical memory" with the student before he can execute any arm-swing-passage of the following type with certainty and dash:

Allegro. Tschaikowsky Op. 72, No. 18.



SECTION 75.

In playing the above chord-and-octave passage at a quick speed the student will note that a fresh element is introduced, namely, a rapid changing of the mould of the hand during the swing of the arm. In the above passage there are fifteen arm-swings. When the arm starts on a new swing the fingers instantaneously change from their old pose into a new one,

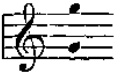
shaping themselves for the coming chord or octave; and whenever this new pose is taken, the muscles are then "fixed" during the remainder of the swing: see Sec. 62. If, in the new pose, the fingers concerned in the coming chord are not spaced with their tips at the same distances from each other as the notes (keys) to be played lie from each other on the keyboard, and if the arm does not bring the hand down "cleanly," that is, landing the finger-tips in the middle of each key, the result will be — wrong notes.

It will be remembered that at the beginning of Sec. 74 the hand, as regards its tension, was, for analysis, divided into two portions: (1) the Palm; (2) the Fingers. Leaving out of consideration the thumb and its power to extend itself sideways from the palm, the act of drawing the other four fingers together or of widening them is originated by muscles lying between the bones in the palm of the hand. The incessant change of pose going on among the fingers during piano-playing is thus to a considerable extent the result of work done in the body of the hand itself. To play correctly without making these changes at the right moment, and with precision, is impossible.

SECTION 76.

A study of the act of assuming and preserving various hand-moulds may now be begun. The following exercises will demand the student's closest attention, seeing that the tips of the playing-fingers must be so held as to measure the same distance from each other as the piano-keys composing the chord or octave lie from each other; and that the arm must drop the hand so cleanly that no other keys than those are felt. The exact "middle" of each key must therefore be touched by the finger-tip: see No. 4 of Sec. 74.

Ex. LVII. One of the simplest tests of the student's "physical (muscular) memory" — see end of Sec. 74 — is the octave-span.

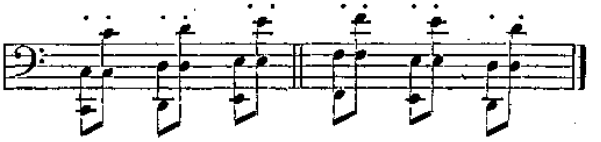
To test this: (1) Place the first and fifth fingers of the right-hand on the notes 

or of the left on  and hold these keys at low-level, keeping the tips of the second, third, and fourth fingers from touching any keys. (2) Raise the arm and hand about six inches directly above these two keys, taking care, while doing so, to keep the hand and fingers "braced": that is, controlled muscularly, so that they retain in the air the same mould or shape they had when holding down the keys. (3) Hold the hand quite still in this mould for a couple of seconds while thinking intently of its muscular feeling, and then destroy the mould by letting all the fingers tumble together. During this collapse of the fingers, the wrist, elbow, and shoulder-joint must be kept motionless. The palm of the hand will therefore not fall. (4) Let the fingers remain in this collapsed state for a couple of seconds, and then resume their previous braced pose. In doing so, the student must try to recollect the exact muscular feeling the hand had before the fingers were allowed to collapse. (5) Let the hand and arm now "fall," the thumb and fifth-finger dropping on to the two keys from which they rose. If the drop is executed neatly, and the mould of the hand has been resumed with perfect exactness, the two fingers will touch nothing but their own keys. Any hand which, when in the octave-span, is large enough to allow of a slight crook at the nail-joint of the thumb — see Sec. 70 and 74 — will probably have little trouble in avoiding untidiness of touch.

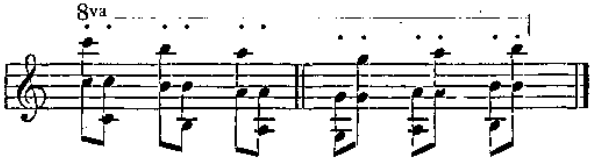
This exercise should be worked at until the student can touch the exact "middle" of the keys many times in succession accurately.

Ex. LVIII. After this may come the study of the arm-swing with the hand fixed in the octave-pose. Scales played in the following way furnish good material for practice.

L. H.



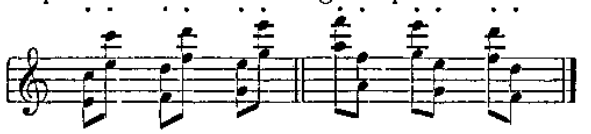
R. H.



The swing of the arm and hand (see Sec. 11) takes place while the latter travels along a curvilinear path in the air from any octave to the following one. During the arm-swing, the whole hand must be fixed; the fingers must remain without movement in themselves; and the wrist must be "braced," though always capable of delicate adjustment on account of the varying relation of the hand to the fore-arm during the passage: see Sec. 78.

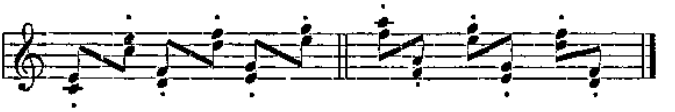
The above exercise is a study for the retention of one hand-mould throughout a whole passage played with a swinging arm.

Ex. LIX. An exercise similar in scope to the above octave one may be practised with the fingers posed for the interval of a sixth



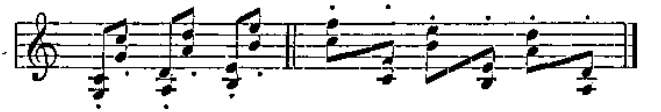
This must be played with the three fingerings 4 and 1: 5 and 1: and 5 and 2: and with the left-hand also.

Ex. LX. A similar exercise may be had playing thirds instead of sixths: —

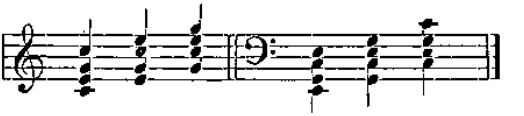


For this, the student would do well to use as many as possible of the fingerings given in Ex. LIII, Sec. 72. This will give him the experience of "fixation" in a variety of hand-poses.

Ex. LXI. The same passage played with the interval of a fourth ought also to be worked at; and with the fingerings 1 and 2: 2 and 4: and 3 and 5.



In the two preceding exercises the hands, while using the fingerings 1 and 2: 2 and 3: 2 and 4: 4 and 5: and 3 and 5, should be held fully extended, and at fairly high tension. This will accustom them to the attitude and physical condition necessary for chords such as the following, in any key: —

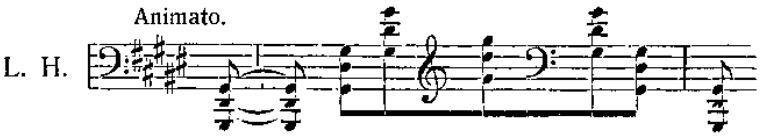


Other exercises of the type of Ex. LVII., though of greater difficulty, should now be practised. These will employ the inner as well as the outside fingers of the hand. All three-finger, four-finger, and five-finger chords may be used as material for testing the student's muscular memory (physical memory), and they must be practised rhythmically.

Ex. LXII. For example, let him choose any chord, say  , and count slowly 1 — 2 — 3 — 4 during the test. At 1, let him play the chord; at 2, raise the arm and hand with the fingers retaining the fixed mould of the chord; at 3, destroy the mould, though keeping the wrist braced (see Ex. LVII.), and at 4, resume the mould. At the following 1, let him drop the hand on to the chord and continue the exercise in the same rhythmic manner.

When the chord used for the exercise is an extended one like the above, the student will find difficulty in dropping to the keys absolutely cleanly. He may be inclined to excuse himself for any untidiness of drop by concluding that his stretch between the fingers is not big enough; and accordingly, may be content if only he is able to come down on the chord without playing any wrong notes. But let him not be convinced that the untidiness is unavoidable until he has tested his hand-tension in every possible way. For small hands the difficulty of attaining perfection in this matter is of course greater.

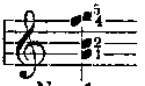
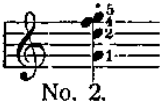
When such chords are played at the conclusion of an arm-spring — as in a passage like the following, from "La Campanella" of Paganini-Liszt:



the widening and narrowing of the angle at the elbow, and the consequent alteration of the angle made at the wrist by (1) the line along the outside of the lower-arm, and (2) that along the outer edge of the palm of the hand, have to be carefully adjusted.

SECTION 77.

Some exercises for the practice of rapid change of tension and hand-mould are given here. This change has been already noticed: Sec. 75. These hand-moulds contain first a one-finger, and then a two-finger change.

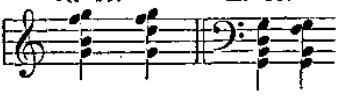
Ex. LXIII. Let the student play  and then change to  taken with the same fingering. The rhythm for this is as follows. Count slowly 1 — 2 — 3 — 4. At 1, play chord No. 1, and then smartly raise the arm and hand six inches above these same keys. At 2, pause. During the quick rise following 1, the second-finger must rapidly change its pose by moving sideways — the rest of the hand meanwhile remaining "fixed." At 3, drop the arm and hand on to chord No. 2, and rise again rapidly to the same height. If the fingers, at the drop, touch any other keys than G, F, D, and G, then either they have been wrongly posed, or the hand has been clumsily dropped. If both rises are correctly made, the hand will be stationary "in the air" some little time before beat 2 or beat 4 arrives. During the quick rise following 3, the second-finger must revert rapidly to its original pose. At 4, pause, as at 2. This chord-alternating process must be continued (with frequent rests for the hand) until the drop has become as "clean" as the student's special build of hand will permit.

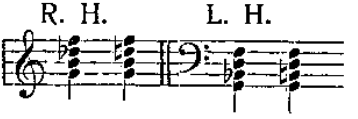
No. 1.

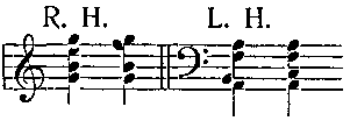
No. 2.

For the practice of the change of one finger of the hand-mould, the following chords may serve as models.

R. H. L. H.

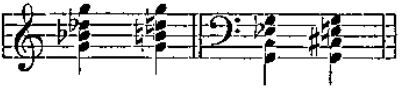
(1) For changing the 2nd finger 

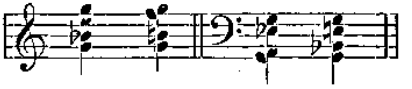
(2) For changing the 3rd finger 

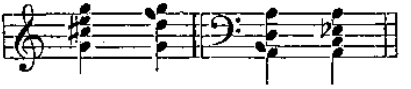
(3) „ „ „ 4th „ 

These chords as well as those in the next exercise must be practised in every key.

Ex. LXIV. For the change of two fingers of the hand-mould the following are models.

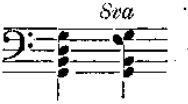
(4) For the 2nd and 3rd fingers 

(5) „ „ 2nd „ 4th „ 

(6) „ „ 3rd „ 4th „ 

Ex. LXV. After these exercises have been worked at, using — as shown above — the same octave for the "change," they must then be played in combination with a swing of the arm. A one-octave swing will be extended enough for preliminary practice.

The notation for the right-hand of No. 1, Ex. LXIII., will be accordingly: 

; and 

for the left-hand. The student may afterwards practise the two-octave arm-swing with the same twelve alterations.

The student must keep in mind that, in order to facilitate cleanness of descent (exactness of touch) at these various

parts of the keyboard, the wrist must be allowed a certain amount of "play": that is, liberty of action for adjustment. Let him re-read the remarks on this matter made at the beginning of Sec. 29, and in Ex. LVIII. of Sec. 76.

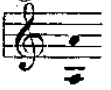
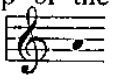
For some excellent hints on chord-playing and change of hand-mould the student may refer to Dr. Riemann's "Anleitung zum Studium der technischen Übungen," published as an appendix to Mertke's "Technical Exercises."

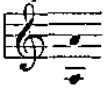
SECTION 78.

In several sections of this chapter mention has been made of the tension of the Wrist. It has been said that in octave-playing, failure will result if the h a n d itself is allowed to act too independently of the a r m; and that the wrist must be "braced," that is, held by muscular tension. On the other hand it has been said that, in octave-playing, the wrist must be allowed to have a certain amount of "play" to permit of alteration of the various angles formed by the line of the fore-arm and the line along the side of the hand. And the one statement seems to contradict the other.

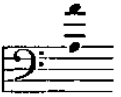
But by the term "fixation" of the wrist is to be understood n o t a state of absolute inflexibility of the joint — a state in which it is incapable of individual movement in any direction. In this exaggerated conception of fixation the relation of the hand to the arm will be regarded as somewhat similar to that of a pen to the holder in which it is fixed — the two being moved together as one — jointlessly. And if this is carried out it will act detrimentally on the arm's upper parts also, by cramping the action of the elbow and shoulder-joint.

The need of a continual alteration of the various angles made by the line of the fore-arm and that along the side of the hand arises from the determinate line of the keyboard in relation to the fixed seat of the player. The line of the key-

board, extending right and left of the player, gives a distance of about two feet measured from its central note to the extreme note at either end. And these distances from the centre — as well as all lesser distances — affect the hand, as far as its line-relation to the fore-arm is concerned: see beginning of Sec. 29. This may be proved by the following experiment. Let the student, sitting at the "middle" of the keyboard, place his right-hand on  and carefully note the angle made by (1) the line along the outside edge of the palm (from the wrist to the fifth-finger knuckle) and (2) the line along the outside of the fore-arm. Let him by muscular tension "fix" this angle firmly, and, with the hand and fore-arm kept in this exact relationship, lift the arm from the piano, open out the angle at the elbow, and place his fifth-finger on the top A of the keyboard. He will find that the tip of the thumb cannot now touch the A an octave below. It touches B, some little way "up" that key: and this, although the distance between the tips of thumb and fifth-finger has remained unaltered. In order to touch the lower A with the tip of the thumb — this distance remaining still unaltered — the outside angle at the wrist made by the two lines above mentioned must be w i d e n e d. Conversely, this now widened angle must be narrowed if the same notes three octaves lower are to be played. If this is not done, the tip of the thumb, when the tip of the fifth touches its spot on  will be off the keyboard.

Ex. LXVI. For the practice of the g r a d u a l alteration of this angle the following exercise may be used. Let the student place the thumb and fifth of the right-hand on the notes  on the surface of these keys at high-level, and,

keeping the tips of the three inner-fingers slightly raised so that they do not brush against the black keys, slowly g l i d e the hand up the keyboard (touching its surface with the thumb and fifth-finger) till the top A is reached by the fifth. Care must be taken that the tips of the two touching-fingers keep always the same distance from each other, and also that they keep the s a m e d i s t a n c e f r o m t h e f r o n t e d g e o f t h e w h i t e k e y s a l l t h e w a y up. This latter precaution will ensure the g r a d u a l alteration (opening out) of the angle at the wrist. This toneless g l i s s a n d o must be practised many times up and down, until the g r a d i n g of the opening and closing of the wrist-angle is exact.

The same must be practised by the left-hand, using the notes  from which to glide to the lowest octave of the keyboard.

During this gliding-up-and-down on the surface of the keys, the weight of the balanced arm must lean gently on them. If this is properly managed, a species of p u r r i n g sound will be heard, caused by the finger-tips as they pass over the interstices between the keys.

Ex. LXVII. The above gliding-up-and-down on the surface of the keys is a good preparatory study for the player who is anxious to be able to execute the g l i s s a n d o in octaves necessary for such a passage as that in the Prestissimo of Beethoven's Sonata, Op. 53.

To preserve an absolutely uniform speed in descending or ascending the keyboard, coupled with the fine grading of the wrist-angle and the conveyance to the keys of an amount of arm-weight sufficient to make each key produce the desired amount of tone, is the problem to be solved in glissando-playing.

The student must begin by gliding with only a single finger up and down the keyboard; and during the preliminary stages of practice he must not attempt to produce any tone. All that should be looked for at first is a very slight depression of each key from its high-level as the arm carries the tensely held hand and finger glidingly up and down the keyboard. And this depression must be "equal" in amount. That is: no key must be allowed to sink farther down than its neighbour has gone. Inequality of key-depression is a sign that the conveyance or distribution of arm-weight is unequal. If this is not attended to from the beginning the passage will be liable to stick, the finger-tip being caught against the side of the key next to the already depressed one.

Toneless practice must be continued until the arm has learned to glide the finger across the keys at a uniform speed, and until the student is able to convey weight to the keys without much feeling of effort.

The speed at which the arm must draw the tense finger along the surface of the keys is about one second of time to two octaves on the keyboard. Any speed much slower than this tends to make the finger stick.

With the exception of the thumb, each finger of both hands with the nail presented to the keys must be practised in ascending and descending glissando-single-note-scales with the hand held first supine, and then prone. When the thumb is used, the hand is held always prone. The student should not practise for long at a time those scales in which the skin of the finger is presented to the keys, as it becomes easily chafed. These are all played with the hand prone. They are played by the second, third, fourth, and fifth-finger of the right-hand descending, and of the left ascending; and by the thumb of the right-hand ascending, and of the left descending.

He will soon discover when it is advisable to attempt to p r o d u c e t o n e from the glissando-scale. Let him be content at first with only the very smallest amount of sound. When he can execute the single-finger scale of two or three octaves with a fairly regular equal tone he may then try to play a scale in sixths up and down, with first and fifth-finger of the same hand. Here the skin of the first-finger and the nail of the fifth will be presented to the keys, while ascending with the right-hand or descending with the left. This order will of course be reversed while playing with either hand a scale proceeding towards the centre of the keyboard. The scale in sixths must be practised tonelessly at first.

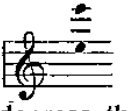
The octave-glissando — mentioned at the beginning of this exercise — comes last of all: practised tonelessly at first, and then with tone.

An example of the glissando double-scale in thirds is found in Liszt's 15th Rhapsodie.

The hand-tension necessary for all these double-scales must be very firm in order to preserve a steady fixed distance between the two playing finger-tips; and the nail-joint of the first-finger (thumb) will naturally crook itself.

SECTION 79.

Besides the alterations of the wrist-angle described in the preceding section there remain to be considered those alterations in the wrist-angle made by (1) the line down the centre of the fore-arm, and (2) that along (down) the back of the hand.

Ex. LXVIII. To make the student certain of what is here meant, let him, while keeping the whole hand fairly well braced, hold down the notes  and, with a gentle swaying motion, elevate and depress the wrist. During this

motion the alteration of the angle made by the two above-mentioned lines takes place. The same motion must be practised with the left-hand. The fifth-finger knuckle must not be allowed to sink.

Ex. LXIX. Another form of the previous exercise is got by making the wrist execute a combined rotary and revolving (circular) movement, while keeping the thumb and fifth-finger on the same two held-down keys. The movement must be made in two directions; the wrist starting its circle (1) upwards and to the right, and (2) upwards and to the left. In this more complex form of wrist-movement the whole hand must be kept in a fairly tense condition. This exercise, even for large hands, is a tiring one; and in order to allow the hand of small stretch to get full benefit from the drill, the octave-span should not be used at first. Two notes a sixth apart may be used instead. The student must not forget to take frequent rests.

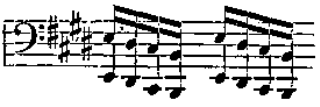
SECTION 80.

In the two preceding sections movements of the fore-arm and hand, resulting in angle-alterations at the wrist, have been discussed. If, during these movements, the student has given any attention to the elbow and shoulder-joint, he will have noted that, when the wrist was elevated, the elbow approached the keyboard, and accordingly that the slope of the upper-arm with relation to the body was altered; and that an alteration in relation of upper-arm to body took place also when the hand was being "carried" up or down the keyboard. In other words, that, during any of these seemingly merely wrist-movements, the whole arm was employed. In the manner in which movements at the three joints — shoulder, elbow, and wrist — are combined, lies the art of octave-playing.

It is probable that, to the student, the only reason for the rise of the wrist as well as for the putting forward of the elbow (and therefore of the fore-arm) during octave-playing, will be the slightly higher level of the b l a c k keys as compared with that of the white, and the distance of their near ends from the outer edge of the white keys: that is, the edge nearest the player.

Ex. LXX. But if the execution of any octave-passage such as:

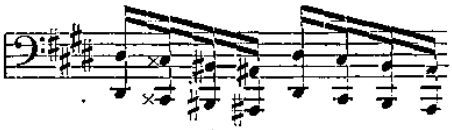
Chopin.



No. 1

or

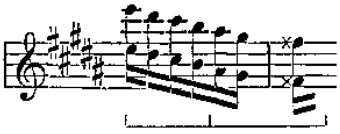
Chopin.



No. 2

Liszt.

or

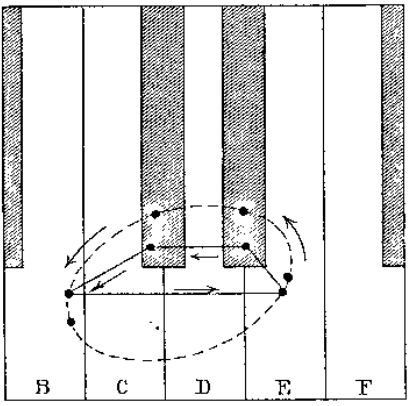


No. 3

were considered from that point of view only, then the whole passage would be treated "in a succession of short straight lines" p r o c e e d i n g f r o m e a c h n o t e t o t h e f o l l o w i n g o n e, instead of in curves, each curve including two, three, or more notes. To attempt to play any of the above passages in the former of these ways would be to omit some of the possibilities of arm-movement. To play it in the latter is to use the "whole" arm, that is, to use that combined action of all its parts — upper-arm, fore-arm, and hand — which enables the student to play easily and quickly. And to use less than that will hinder his execution of the passage.

To illustrate what is meant by treating the octave-passage "in straight lines," and "in curve-lines," let the following diagram represent that portion of the keyboard used in the first of the examples given above:

Left Hand.



and the spots signify the actual place on each key touched by the finger-tips.

The spots connected by straight lines are placed as near each other as would be comfortable for the player who should imagine that to have them placed thus would be equivalent to increase of speed in executing the passage. The straight line drawn from spot to spot represents the shortest distance between one spot and the next; and each spot is at the vertex of an angle. At each spot, therefore, the direction in which the wrist-centre is travelling must be altered. There are thus four alterations of direction in the note-pattern.

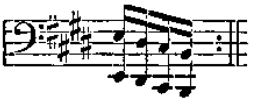
The spots connected by the dotted line are at the place on each key touched by the finger-tips as they travel along the periphery of the curvilinear figure while executing this same passage.

It will be noted that the length measured round the ellipse must be g r e a t e r than that along the four-sided figure (trapezoid), seeing that the latter is contained wholly within the former. From this fact it might be thought that the wrist-centre would take a longer time to travel round the elliptic figure. But in travelling round the latter t h e r e i s n o c h a n g e o f d i r e c t i o n; in the trapezoid there are four changes: one at each angle.

SECTION 81.

The arm, while guiding the hand round the periphery of the ellipse, executes a complex movement. The h e i g h t of the wrist-centre above the level of the keys is constantly varying. It rises and falls like a switchback. The figure executed during the rise and fall is that of the "reversed" ellipse: see Sec. 52.

It will be noted also that the distances between the spots on the ellipse are all u n e q u a l; while the note-pattern



contains four notes of e q u a l length. This is a case of the ellipse divided unequally as to speed: see Sec. 43. This alteration of speed during the ellipse, necessary in order to make the latter fit the rhythm of the note-pattern, adds another element of complexity to its execution.

And lastly, there are to be considered the constant action and minute degree of fore-arm rotation; (pronation and supination). This will vary slightly according to the size and breadth of the player's hand, and also according to the fingering he makes use of. If he uses 1 and 5 throughout, the wrist will have less independent action: if 1 and 4 are used for the two pairs of black keys, there will be rather more turning of the hand sideways, and less action of the shoulder-joint.

In example No. 2 of this section, the "ordinary" ellipse is used — see Sec. 44 — and all four octaves are played to its l o w e r - c u r v e, the upper-curve occurring between the A♯ and the D♯ — the first note of the following group. In this matter it presents a contrast to example No. 1, in which the four octaves are played to the u p p e r - curve: the lower-curve occurring between B and E. Example No. 3 contains two note-patterns: one of four, the other of three notes; and they are both made to an upper-curve. The two curves are connected by a Loop of the wrist made rapidly on B.

From a comparison of No. 1 with No. 2 the student will probably discover that the reason why the place of the upper-curve in the one is taken by the lower-curve in the other, is a difference in the order or arrangement of the black keys. In No. 1 they occupy an inner position: in No. 2 an outer; and as their level is higher than that of the white keys it is natural that the wrist-level should be higher also.

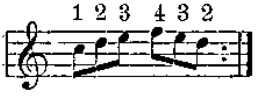
SECTION 82.

But from this fact it must not be concluded that if an octave-passage contain no black keys there is therefore no necessity for variety of wrist-level. On the contrary, the undulating movement of the wrist is favourable to the securing also of a curvilinear key-pathway for the fingers; and the latter again is in many cases favourable to the acquirement of speed, to the exact "placing" of the finger-tips, and to avoidance of muscular fatigue. These statements will have been proved by the student in the case of note-patterns containing both black and white keys, if he has worked faithfully at those given in Sec. 80. He must now begin the study of octave-passages for white keys only, for the easiest

execution of many of which, curvilinear pathways on the keys are essential.

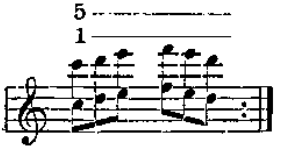
At the beginning of Sec. 44 the definition was given of the term "ordinary" ellipse; and at the beginning of Sec. 52 of the term "reversed" ellipse. The student must keep these clearly in mind, as otherwise he will have difficulty in fitting any white-key octave-passage with its correct curve-lines. To give an example of this fitting of the one to the other: —

Ex. LXXI. If the following note-pattern, in single notes



is fitted correctly with its ellipse, the first three notes will, according to the definition given in Sec. 44, be played to a lower-curve; the last three to an upper. The only curvilinear pathway here followed is that described by the wrist-centre in the air, the finger-tips being led passively to and from their places on their keys by the rolling-motion of the arm: see Sec. 23.

But if that same note-pattern be played in octaves

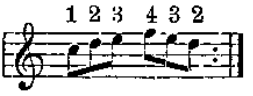


then each "set" of notes is played by the same finger throughout — by the first-finger in the lower set, and by the fifth in the higher.

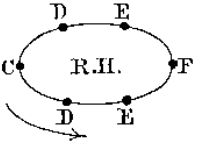
At the beginning of this section it was said that the player, for the sake of nursing his physical strength and of acquiring speed in octave-playing, should make use of the wrist's faculty of undulating, sinuous, rolling movement: in other words, should use a combination-movement of all the parts of the arm. And the examples already given have been note-patterns containing both black and white keys. It will be found that, even in an octave-passage containing only white keys, the undulating movement of the wrist will suggest to the finger-tips the desirability of their varying their position — of advancing to and retiring from the neighbourhood of

the near ends of the black keys. The rise of the wrist suggests an advance of the fore-arm: the fall, a retreat. Its highest elevation is synchronous with the closest proximity of the finger-tips to the ends of the black keys; and vice versa. Given any white-key octave-passage to be fitted with its correct curve-lines, the student will have first to reduce it to single notes, and then to fix on those parts of the single-note passage where the highest, and on those where the lowest wrist-elevations should take place: in other words, to find the most suitable fingering for it, and to fit that fingering with curve-lines.

To return then to the pattern in single notes given above

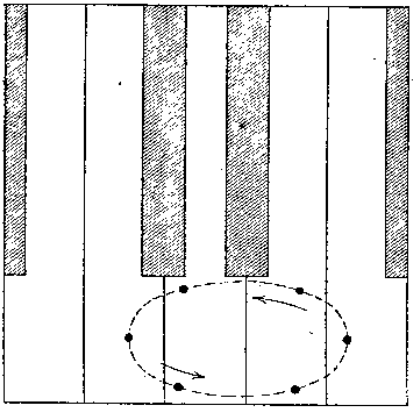


. Its diagram is



: the curvilinear figure representing the line described in the air by the wrist-centre during the arm-rolling-motion. The wrist's lowest elevation therefore is between the first D and E of the note-pattern: its highest between the last E and D. When the note-pattern is played in octaves, the curve-line described in the air by the wrist-centre is the same as it is when played in single notes. Therefore, according to the statement made in the preceding paragraph, the finger-tips will be nearest the outer edge of the keys between the first D and E of the note-pattern, and nearest the ends of the black keys between the last E and D. A comparison of the following diagram, representing the finger-tip pathway on the flat — with the diagram at the beginning of this paragraph, representing the wrist's pathway "in the air" — shows a marked similarity between the two.

Right Hand.



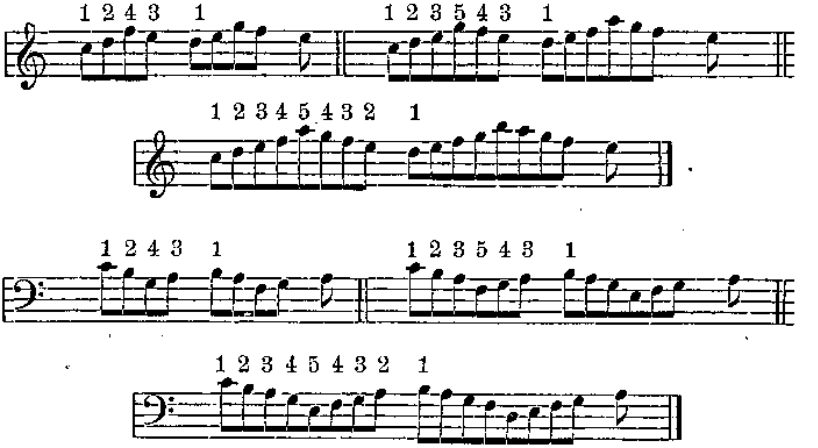
SECTION 83.

In deciding as to which notes of any white-key octave-passage are to be played to the lower-curve and which to the upper-curve of an ellipse, the student need never be in a difficulty if he will first play the passage as if it were written in single notes, and fit these to the "ordinary" ellipse. When that has been decided, he will then see, from the undulating line made by the wrist-centre, how to construct a finger-tip key-pathway corresponding exactly with that undulating line. A very simple solution of this "correspondence" may be had if the student will think of a coin lying flat on the white keys with a part of its rim hinged to a spot close to their front edge. By means of the hinge the coin may be made to stand on end. When lying flat, the line round its rim represents — though only approximately — the finger-tip key-pathway: when standing on end, that same line represents — approximately — the line that the wrist-centre describes in the air. A certain part of the coin — the hinged part — locates in itself both finger-tip proximity to

key-edge, and also lowest elevation of wrist-centre. In playing, these two things occur at the same moment.

The student will of course understand that in the above illustration, the circular shape of the coin's rimoutline is not to be considered strictly. The line of the pathway followed by either the finger-tips or the wrist-centre will probably be elliptic.

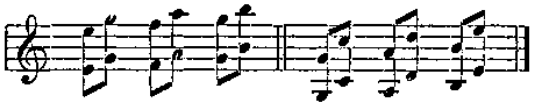
Ex. LXXII. Some white-key sequential note-patterns — to be played in octaves — are given here as a test of the student's ability to fit such with their correct finger-tip key-pathways.



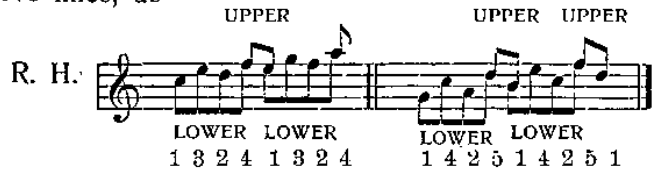
Though meant to be played in octaves with first and fifth-finger throughout, they are here given in single-notes, and with the fingerings suitable for them if so played. To find the fingering for the passage when reduced to single notes is the student's first duty. From this fingering, he will find the correct elliptic figure and the wrist-curves; and from these, the finger-tip

key-pathway for the passage as an octave-passage. If he has kept in mind the general rule given at the beginning of Sec. 44 he will see that the above sequential note-patterns will be played to the "ordinary" elliptic figure.

Ex. LXXIII. Another octave-note-pattern of sequential nature, in which the sequence is at first sight perhaps less apparent, is the following:

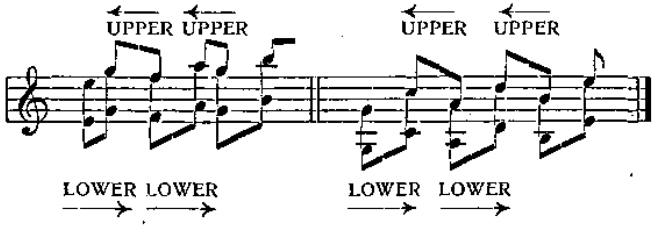


Played in single notes, these would suggest unequal curve lines, as



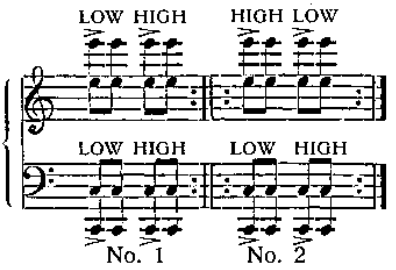
See Sec. 47.

But for treatment as octave-passages they are better subdivided as follows:



As the arrows in the above point, the wrist-centre travels; in the lower-curve, from left to right: in the upper-curve (notwithstanding the "notational" contradiction) from right to left. The direction of the "throw" of the arm, and therefore of the curve, is changed at every note. This change must be executed with extreme rapidity. The wrist is highest during the upper-curves.

Ex. LXXIV. The following exercises will accustom the student to the rapid interchange of high and low wrist-level:



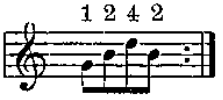
The change from low to high wrist-level must be made very smartly, and the careful accentuation of every alternate note preserved throughout. Ex. 2, in which a contrary action of the wrists is taught, is a good preparatory study for all octave-scales in which the same pairs of notes are not played simultaneously in both hands, and in which black keys are present.

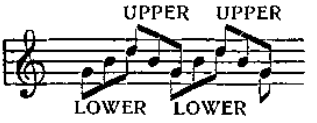
Examples 1 and 2 may then be played as if written in triplets, accentuating the first note of every triplet, and making the wrist-motion now undulating, instead of jerky. Two triplets of quavers will be played to each complete up-and-down motion of the wrist.

SECTION 84.

The execution of arpeggios in octaves is comparatively simple when the note-pattern contains even one black key, as the presence of this key both guides the eye and relieves the wrist. The black key's place in the arpeggio determines the moment at which the wrist-curve is at its highest. But when the arpeggio in octaves contains white keys only, its execution is attended with some risk. The difficulty of avoiding miscalculation of the distance from key to key in the arpeggio

is increased, the uniform level and colour of the keys affording no key-board assistance to either the wrist or the eye. Help then must be looked for from another quarter. And the student who has already experienced what the arm-rolling-motion and the undulating movement of the wrist can do for him will probably be not surprised to find that they will help him to surmount the present difficulty also.

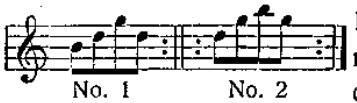
Ex. LXXV. One of the simplest forms of arpeggio in single notes is 

This, played to an "ordinary" ellipse, gives: 

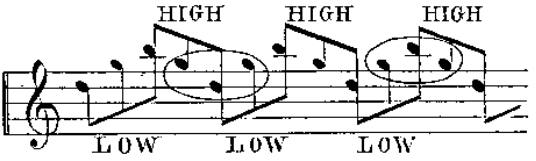
Having fixed on the pathway of the wrist-curves and the direction in which they are to be followed, the student, when he plays the above arpeggio in octaves, has only to remember that the d e s c e n t of the wrist is accompanied by a drawing of the finger-tips towards the near edge of the keys — that is, the edge nearest the player — and the a s c e n t of the wrist by a leading of the finger-tips nearer the ends of the black keys. The whole complex movement is (1) an advance-and-retire movement of the arm and hand, (2) the describing of a curvilinear pattern on the keys (close to their surface) by the finger-tips, and (3) the describing of a curvilinear pathway "in the air" by the wrist-centre. The tension of shoulder, arm, and hand, necessary for the control of the distance between thumb and fifth-finger, and for the rapid conveyance of the whole hand from key to key must never be forgotten. The student will understand that the terms "drawing back the finger-tips" and "leading forward the finger-tips" imply n o i n d e p e n d e n t i n d i v i d u a l m o v e-

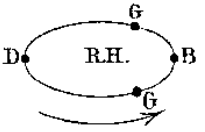
ment of the fingers themselves. The movement is made from the shoulder.

Ex. LXXVI. If either inversion of the above arpeggio

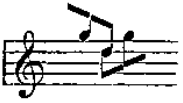
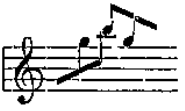


be played in octaves, a difficulty not experienced in playing the root-chord will be encountered. Example No. 2, notated to show the curves of the ellipse to which it is played, presents the following curve-plan:



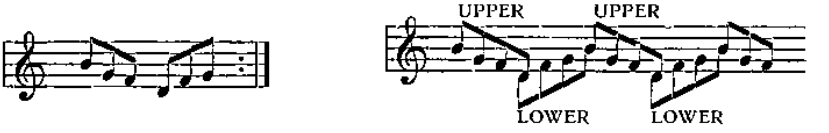
The same, graphically illustrated, is 

: or approximately so.

This is a case in which the different parts of the ellipse are travelled over at different speeds. In the two note-patterns it will be seen that although the sound-distance is the same throughout — in other words, the notes are all of the same length — the distance on the keyboard varies. Therefore, the hand, when playing the passage in octaves, will be hurried over the interval of the fourth  more quickly than over that of the third  . It will be impossible for the student to consciously alter the speed when the hand is travelling quickly. But it is possible

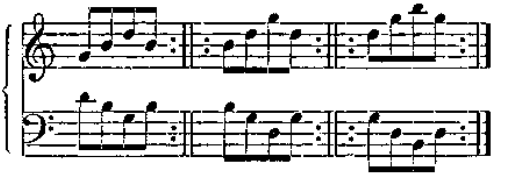
for him to r e g u l a t e it in some measure. By very slightly raising the wrist when he comes to the g r e a t e r interval — the fourth — the hand will be given a slightly increased "throw" or "swing," and the fingers will thus be landed on the required notes (keys).

Conversely, when, in an arpeggio in octaves, the interval between any pair of neighbouring keys is smaller than that between any other neighbouring pair, as in the following between G and F:



the "throw" of the hand will be slightly decreased in impetus.

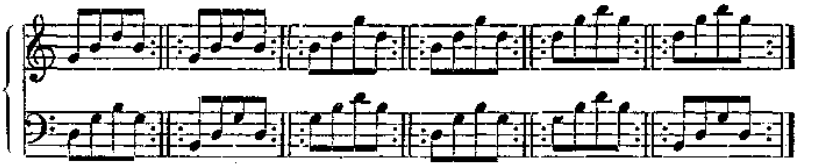
Ex. LXXVII. In beginning the study of two-handed octave-arpeggios with both hands simultaneously, those in contrary motion must be worked at first, as the student will then have similar curves in both hands simultaneously. In each of the three following examples the arpeggio is begun on the lower-curve, and finished on the upper.



They may then be permutated in the six possible ways, namely, No. 1 of the right-hand played with Nos. 2 and 3 in the left, No. 2 of the right-hand with Nos. 1 and 3 in the left, and No. 3 of the right-hand with Nos. 1 and 2 in the left. In each of these six cases more complexity of movement is introduced, as the "throw" in both hands is made n o t at the same moment.

Ex. LXXVIII. The above examples may afterwards be practised in parallel (similar) motion: that is, playing the same notes in both hands. The parallelism is, however, seen only in the notation and in the journey of the hands and arms from left to right, and vice versa, simultaneously. The curve-lines of the ellipse travel in compound-parallel-motion: that is, the lower-curve in the one hand is executed simultaneously with the upper-curve in the other. This was explained in Sec. 49.

Ex. LXXIX.



The above six octave-arpeggio exercises give, in compound-parallel-motion, the permutations of the inversions possible for the first example in Ex. LXXV. They must be transposed into every key, major and minor.

For some helpful hints on Octave-playing, see Matthay's "Relaxation Studies," Set XV.

SECTION 85.

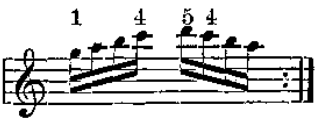
In No. 6 of Sec. 37, and in Sec. 42, it was said that a certain tension of hand and arm is necessary for the equal distribution of weight to the keys; and at the beginning of Sec. 69, that the same is necessary for legato-playing also.

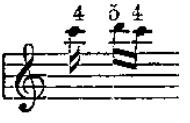
It may perhaps help the student to keep his ideas on this matter clear if he in the meantime think of the term Weight as equivalent to Speed of Hammer-blow. Weight produces tone; and the amount of tone is the result of the speed at which the key is depressed by weight coming from muscles of the back, chest, and shoulder through the

arm: the quicker the speed the greater the tone: see Sec. 3, 4, and 7. It will help to keep his mind clear if he also avoid trying to differentiate between finger-weight, hand-weight, fore-arm-weight, etc., and think of all tone — even when of the smallest quantity — as coming simply from the Arm.

It is evident that by the term "equal distribution" of weight some comparison is instituted, seeing that no single Pianoforte-tone can be thought of as "equal." Therefore, two tones at least must be involved in the term. And the student will find that when tones follow each other in quick succession a background of tension in the arm and hand is needed to regulate or govern equality of production.

It is of paramount importance that each student should make a critical study of his own hand, and learn to understand it in all its moods. Its particular build and muscle-vesture must be closely studied. As a general rule, the soft and loosely-jointed hand will be unable, without special training in the art of tension, to execute quick passages with a clear and brilliant tone — whether loudly or softly. Even the well-built hand may have its weak spot, obstructing the passing of the arm-weight through to the keys. When this is the case, the location will not unlikely be in the neighbourhood of the knuckles of the fourth and fifth-finger. See Sec. 74.

In playing the familiar note-pattern 

every student will be aware of the difficulty met with in making all the tones (notes) of equal value. By the term equal "value" is here implied equal strength, as well as equal length. Most pupils will make C, D, C 

sound weaker — less sonorous — than the other notes of the pattern, and will probably conclude that this is the result of the weakness of the fourth and fifth fingers — the fingers being regarded probably

as implements for s t r i k i n g the keys: see Sec. 16 and 17. But if the fifth-finger side of the palm-square has been drilled sufficiently, it will then, even though the hand may not be of ideal perfection of build, be capable of assuming a tension sufficiently firm to enable it to transfer to each key (note) in any passage Weight at the Speed necessary to elicit the required amount of tone. The student will find little difficulty in doing this if he has thoroughly mastered the muscular action detailed in Ex. XLVI., Sec. 64, and Ex. XLVII., Sec. 65.

The a m o u n t of induced tension necessary before tone of any special brightness or distinctness can be produced in rapid passages will depend on the natural muscle-consistency belonging to each hand, and on the special aesthetic necessity of the moment. The well-known rapid l e g g i e r o and l e g g i e r i s s i m o passages occurring so often in the compositions of Chopin and Liszt are unplayable without some degree of fine muscular tension. The player's listening ear will tell him h o w m u c h to use.

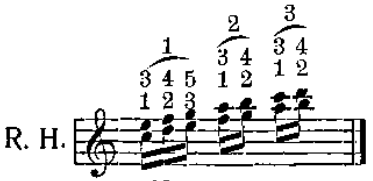
CHAPTER XVII.

DOUBLE-SCALES. THE TREMOLO. THE TRILL.

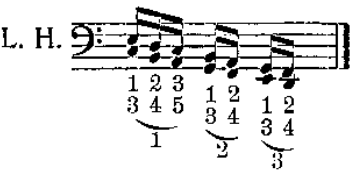
SECTION 86.

DOUBLE-SCALES.

The fitting of wrist-curve-lines to the note-patterns of a double-scale for the perfecting of its tone-production is one of the most difficult tasks imposed on the student. A double-scale note-pattern is any group of double-notes starting with a pair of fingers one of which is the thumb. This will be understood from the following examples, each one containing three note-patterns:



No. 1



No. 2

From the fingering of the above it will be evident that it is impossible to play the scales legato throughout, and that the difficulty consists in making the arm and hand swing so as to connect the note-patterns and play the scale as legato as possible.

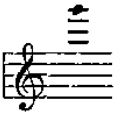
The impossibility of making all the neighbouring pairs of notes legato may be proved if the last pair of the first note-pattern and the first pair of the second in Example No. 1

be examined. The E in the one pair and the A in the other are both taken with the third-finger, and between these two notes there is the interval of a fourth.

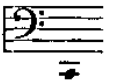
But though it is impossible to make all the notes of one of the "sets" — that is, upper or lower row of notes — in the scale l e g a t o, it is quite possible to do so in the case of the other set. And this, in a double-scale w i t h t h e a b o v e f i n g e r i n g and in quick t e m p o, is all that can be expected. Other fingerings, by means of which passages in thirds may be played absolutely l e g a t o, will be mentioned later on: see end of Sec. 89.

In playing either of the above examples, the set of notes — upper in the right hand, lower in the left — which may be played l e g a t o is executed with the help of a series of Loops made by the wrist-centre. The following exercises will show the student how to apply the loop to the double-scale.

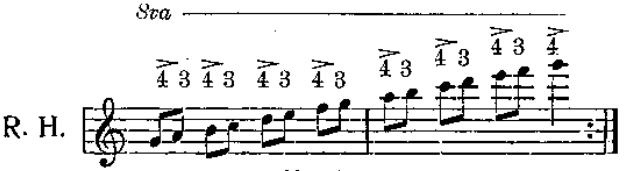
SECTION 87.

Ex. LXXX. Let the student place his right-hand fourth finger on  holding the key at low-level, and make a circular outline with the wrist-centre. During this arm-and-hand-movement a part of the p a l m must be held directly over the keys. This may be done by turning the wrist inwards, that is, making it point in the direction of the central keys of the piano. If this is done the line along the fingers will be d i a g o n a l to that along the keys from back to front. The wrist must make its upper-curve from left to right: that is, proceeding in the direction away from the central keys of the piano. The wrist-centre travels in "Reversed" direction: see Sec. 52.

This arm-movement must be repeated many times, until any slight awkwardness consequent on the unusual hand-position is removed.

The left-hand must be similarly drilled — the fourth-finger holding down  and the upper-curve of the circle proceeding from right to left: that is, in the direction away from the central keys of the piano. Part of the palm of the hand must be held over the keys during the wrist-movement.

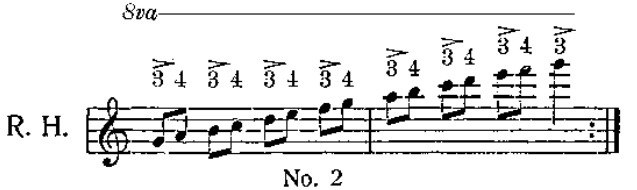
Ex. LXXXI. Let the pupil play the following scale with the right-hand and with the given fingering.



No. 1

The wrist must be held turned inwards: that is, pointing towards the central keys of the piano. When the fourth-finger is played, the lower-curve — from right to left — is made and the hand supinated; when the third-finger is played the upper-curve — from left to right — is made and the hand pronated. The "accented" curves must be made with a strong swing of the arm, so as to throw the third-finger over the fourth, and ensure a perfect join.

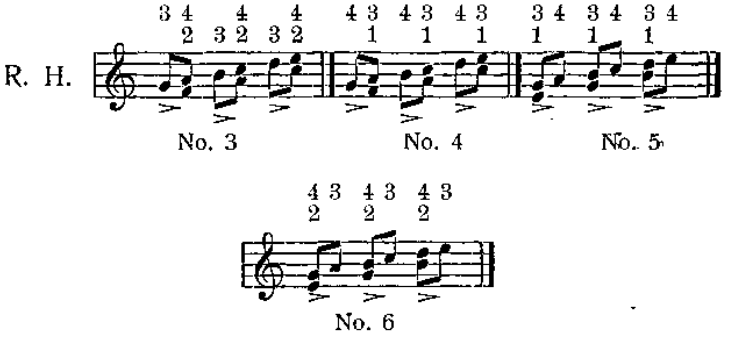
The scale must then be played as follows:



No. 2

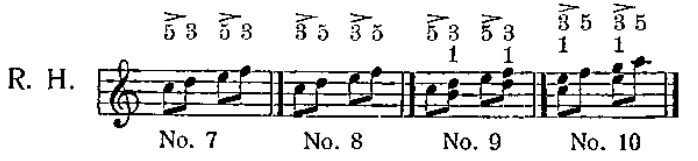
The wrist is held with the same inward direction, as in Scale No. 1, but the start is now made with the third-finger played to an upper-curve. In these scales the continuous making of the loop gives the hand the appearance of being engaged as if in the act of stirring.

Ex. LXXXII. After mastering the above scales the student must practise them with the addition of one of the notes of the other set: —

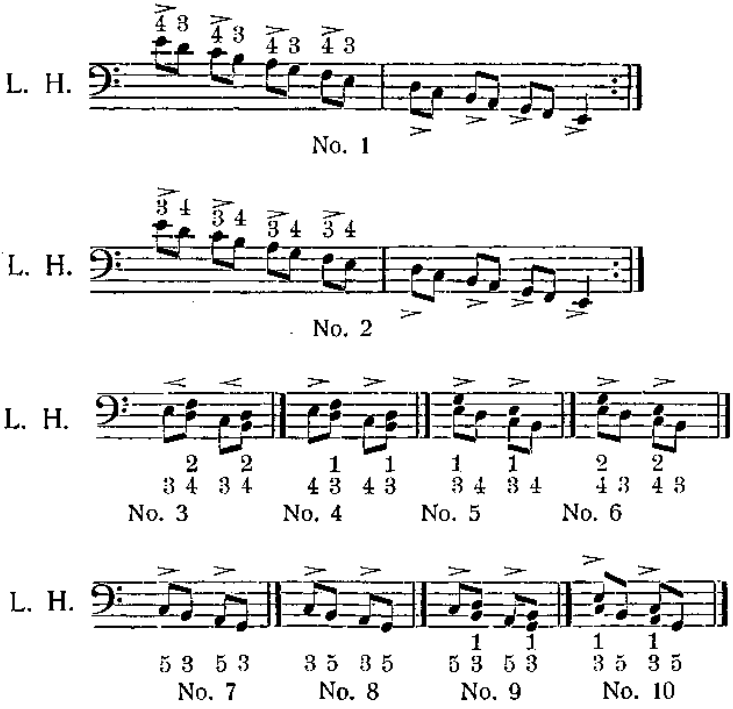


The notes taken by the second-finger in No. 3 and No. 6 must be played staccato. The curve-conditions and wrist-condition which obtained in Scales No. 1 and 2 must be continued here. The accentuation also must be attended to, and the scales extended to at least two octaves up the keyboard.

Ex. LXXXIII. For the practice of swinging the third-finger across the fifth, the student must work at the following exercises. The third-finger is played to the upper-curve.



Ex. LXXXIV. For the left-hand, the scales corresponding to those given in the three preceding exercises are the following ten:

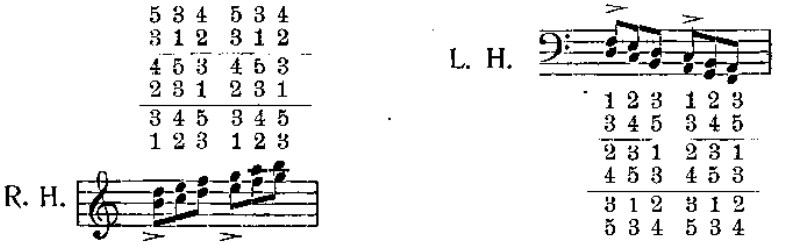


The notes taken by the second-finger in No. 3 and No. 6 must be played staccato.

The student must keep in mind that in every exercise of this section the third-finger and the upper-curve of the loop or circular wrist-motion always come at the same time.

Ex. LXXXV. The following double-scale, in which the third and fifth fingers appear in every note-pattern, affords good practice in the making of the loop. The latter is made very swiftly while the third and first have hold of their keys.

The hand is then swung on an upper-curve, during which the next two pairs of notes are played:

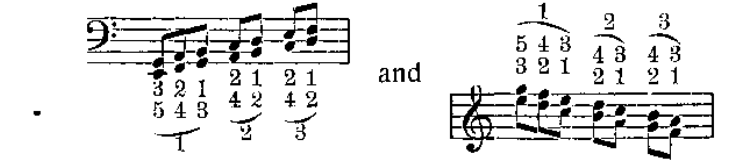


These must be extended in the right-hand to the top, and in the left to the bottom of the keyboard.

Ex. LXXXVI. A final, and searching test of the student's independence of arm-and-wrist action may be had by playing simultaneously any one of the above three fingerings of the right-hand scale with either of the dissimilar ones of the left. This gives six combinations.

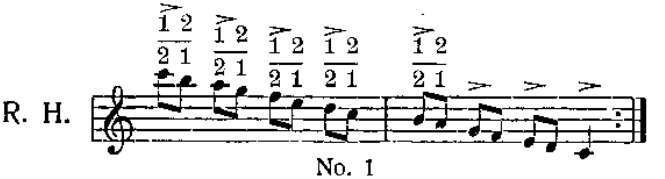
SECTION 88.

The preceding section was devoted to the consideration of the right-hand double-scale ascending, and the left-hand descending. The converse of these, namely:

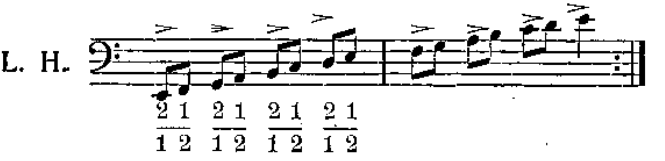


need perhaps less explanation, seeing that, in both of them, the set of notes — lower set in the right-hand, upper in the left — which can be played legato throughout, contains the thumb, the natural pivot of the hand.

Ex. LXXXVII. Notwithstanding this fact, the student is advised to make a special study of the set in which the thumb plays so important a part: and firstly in single notes.



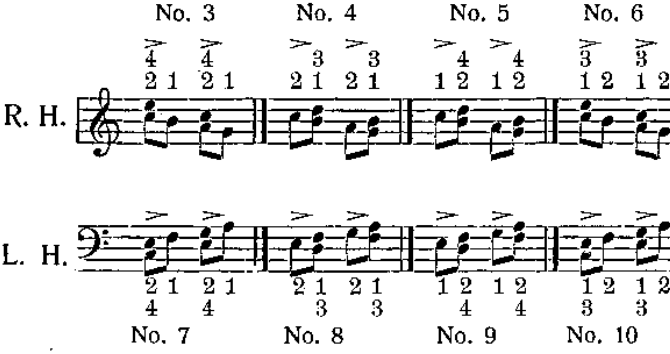
No. 1



No. 2

In these two scales the thumb-note is played always to a lower-curve, proceeding, in the right-hand, from left to right, and in the left-hand, from right to left.

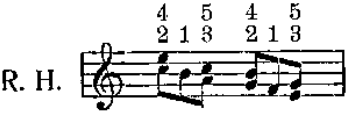
Ex. LXXXVIII. After these may come the same scales with an alternate note of the other set added:



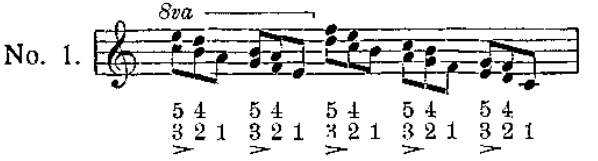
The notes taken by the third-finger in Nos. 4, 6, 8, and 10 must be played staccato. As each of the above eight exercises ought to be extended to at least two octaves, the right-hand ones may therefore be begun two octaves higher than they are here written, the left-hand ones two octaves

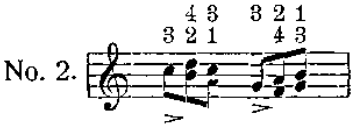
lower. The swing of the hand and arm must never be forgotten. The wrist-curves are played in the same manner as was indicated for Ex. LXXXVII.

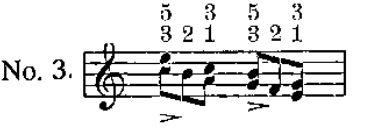
Ex. LXXXIX. The following scales, in which the third and fifth fingers appear in many of the note-patterns, are somewhat similar to those given in Ex. LXXXIV. Like those in the preceding exercise they must be extended to at least two octaves. The wrist is at its highest wherever the third-finger immediately follows a first-finger, as in the third and sixth groups of the following note-pattern:

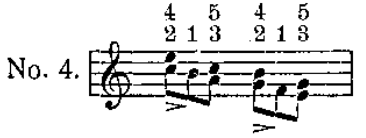


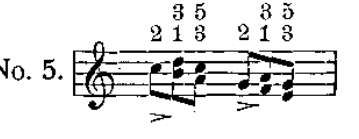
No. 1 is written out in full as a model on which the other note-patterns are to be extended and played.

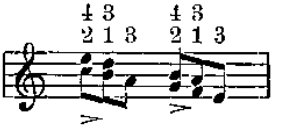


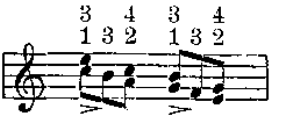


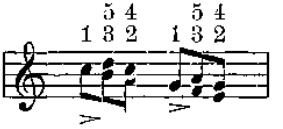


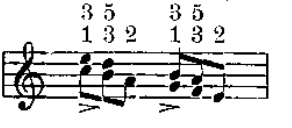




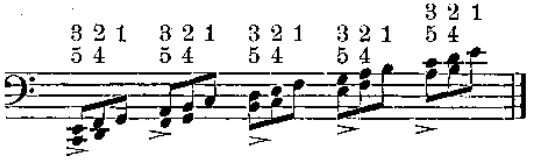
No. 6. 

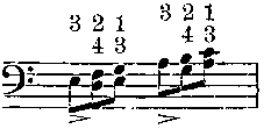
No. 7. 

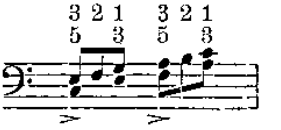
No. 8. 

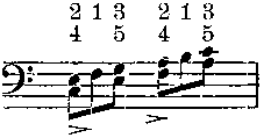
No. 9. 

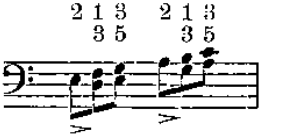
Ex. XC. The following are the nine ascending scales for the left-hand corresponding to the above nine descending ones for the right. No. 1 is written out in full.

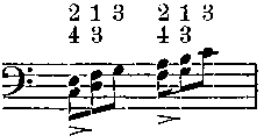
No. 1. 

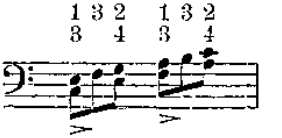
No. 2. 

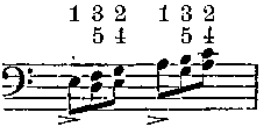
No. 3. 

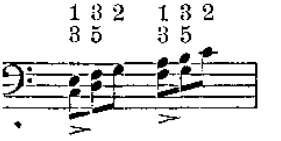
No. 4. 

No. 5. 

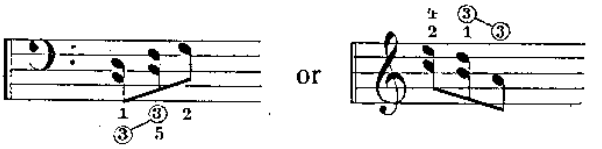
No. 6. 

No. 7. 

No. 8. 

No. 9. 

The student must remember that whenever, in any of the note-patterns of this and the preceding exercise, the third-finger appears in two contiguous groups, as

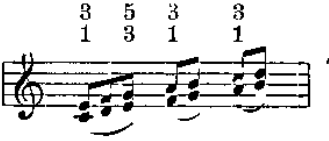


the first of the two notes played by that finger must be staccato.

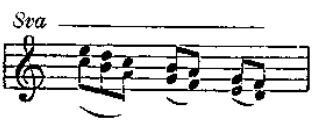
All the exercises in this and the preceding section ought to be practised in every major and minor key, and with the given fingering.

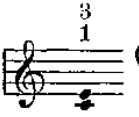
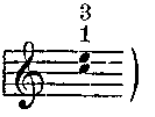
SECTION 89.

In this section the double-scale will be considered as an academic prescription, and measured out in octave-lengths. A scale, in this guise, must be made to return on itself — to turn back at top and bottom. And the "turn-back" must be fitted with suitable fingering, and also with correct curve-lines.

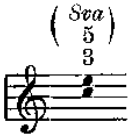
In a C major two-octave double-scale in thirds, the lower octave for the right-hand is  The next octave — the top octave — consists of the same seven pairs, though with a difference in the note-patterns.

The first octave of the return-scale is as follows:

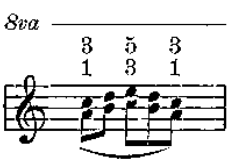


The pair of notes  (or ) which, in the ascent of the scale, was taken with the first

and third-finger, ought, at the top of the scale, for descending purposes, to be fingered with the fifth and third:

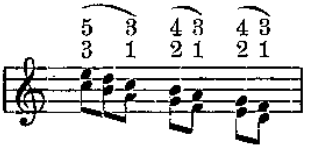


This pair, which, in the ascent, was the first of a note-pattern consisting of three pairs, becomes now the third of a note-pattern of five pairs:

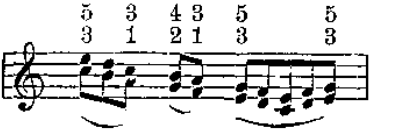


and is played to an "ordinary" ellipse; or, more correctly speaking, circle: see end of Sec. 42.

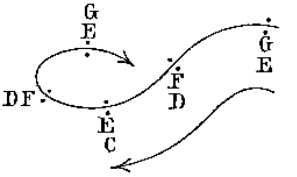
Similarly, in the descent of the two-octave scale for the right-hand, the lower octave, which, if it were not the lowest one, would be



becomes



this last note-pattern of five pairs being played to a curve-line of the following type:

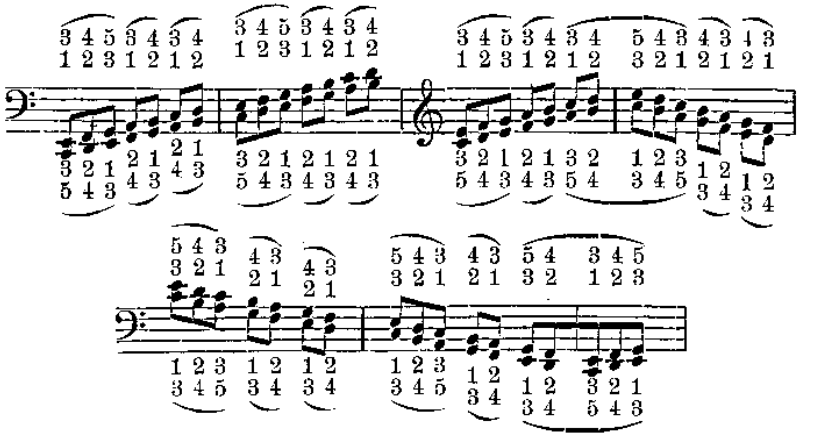


For a similar curve in the single-note scale see Sec. 59, Ex. XLII., No. 5.

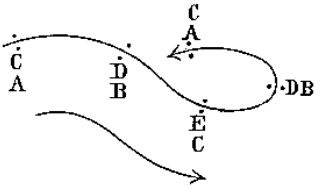
It will be noted that, in the right-hand descending double-scale, the order of fingering in every octave except the lowest is given as $\begin{matrix} 5\,4\,3 & 4\,3 & 4\,3 \\ 3\,2\,1 & 2\,1 & 2\,1 \end{matrix}$. This gives 5 and 3 for every E and C when paired together, except for the lowest E and C. With this order of fingering, which is different

from that usually given, a similarity between the beginnings of all the descending octaves is obtained. It is considered also that a more free execution of the whole scale is possible. It will also present an exact copy — reversed — of the left-hand ascending fingering; and this will make a two-handed contrary-motion scale much easier.

Ex. XCI. An ascending and descending double-scale of three octaves is here given, showing the fingering for both hands as described above:

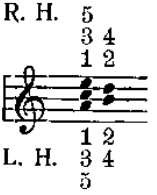


The top left-hand five-pair note-pattern is played to a curve-line of the following type:

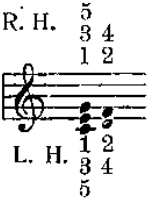


see Sec. 59, Ex. XLII., No. 3: while the left-hand five-pair note-pattern at the bottom of the scale is played to an "ordinary" ellipse or circle.

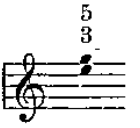
The student will note that the five-pair note-pattern in the descending scale occupies a place in the scale different from that which it has in the ascending one. In the descending it is



in the ascending



If the scale had been extended two pairs of notes, so as to make it finish on the fifth and third of the scale

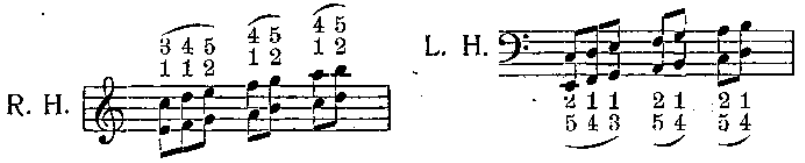


no dissimilarity in the placing of the note-patterns would have occurred. But in few scale-manuals is it given so.

In practising the double-scale in thirds the student is strongly recommended to make use of the fingering written out above in full for every key, both major and minor. It must be noted that this is not the easiest method of fingering scales containing black keys. But seeing that a scale — and indeed all purely technical non-applied work — is practised not so much for its own sake as for the good it does to the student's general pianistic intelligence, and to the perfecting of his tone-production, to minimise the difficulty of each black-key-scale by choosing for it the easiest possible fingering is to miss some of its technical value. The action of the rolling-motion of the arm is peculiarly fitted for mastering the difficulties in double-scales created by the presence of the black keys.

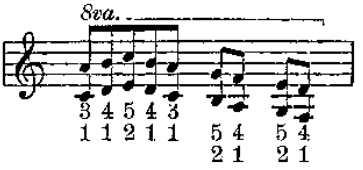
Ex. XCII. In fingering the double-scale in sixths, the student may be guided by the rules given above for fingering

the double-scale in thirds. Here also there are three note-patterns in each octave:

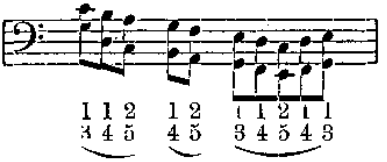


one of three pairs, and two of two pairs, in each hand.

In the top octave of the right-hand, just before the scale turns back, the second of the two-pair note-patterns is elided, and the five-pair note-pattern is then used for the start of the descending scale:



The same is the case with the lowest octave in the left hand, just before the scale turns back:

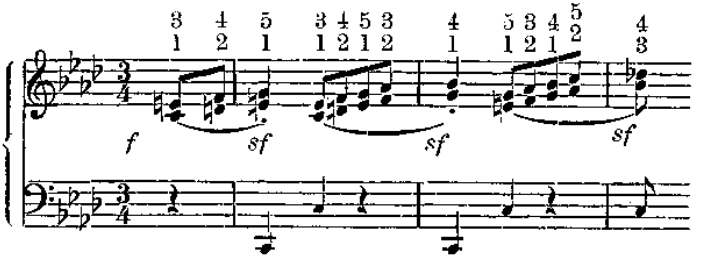


This fingering-model must be used for every key, major and minor.

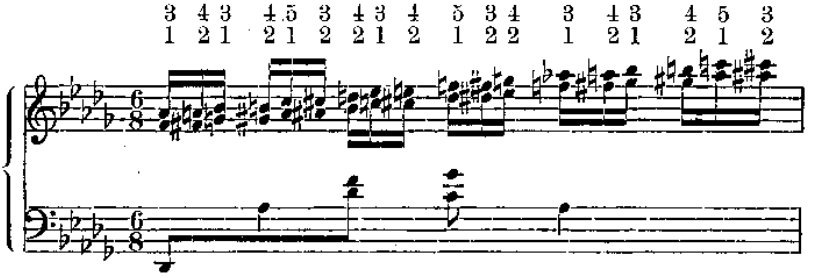
Ex. XCIII. In Sec. 86 it was said that both the upper and under set of notes in a passage in thirds may be played absolutely legato: that is, without break. Reference is now made to passages in thirds when they are "applied" —

when they are essentially part of a musical phrase. Of this type are the following:

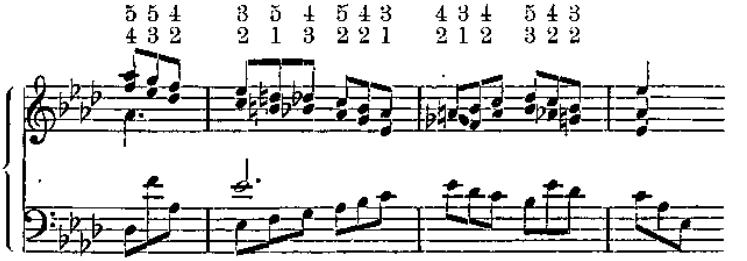
Beethoven. Op. 26.



Chopin. Berceuse.



Moszkowski. Près du berceau.



The fitting of such passages with "legato" fingering is managed by means of various devices.

(1) Frequent use of the thumb in one or other of the two sets of notes.

(2) Gliding a finger from a black on to a white key.

(3) The use of distant fingers in a pair of notes: as

5 5 4
1' 2' 1

(4) The use of contiguous fingers in a pair of notes: as 5 4 3
4' 3' or 2

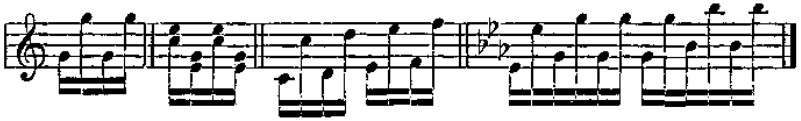
These devices will be seen in the quotations given above.

The most celebrated example of the creation of a work of art out of passages in thirds is Chopin's G♯ minor Etude, Op. 25, No. 6.

SECTION 90.

THE TREMOLO.

The term tremolo is used here to signify an arm-movement of a special Vibratory nature; and the type of note-pattern for which the tremolo is used is the following:



In these there will be seen the rapid alternation of two single notes or pairs of notes, or a scale or arpeggio in "broken" octaves.

The arm-movement necessary for the production of the full tone of the instrument — whether piano or forte — in such passages, is a movement of the whole arm. From this the student is to infer, not that he must make an attempt to move every joint of the arm individually and simultaneously, but rather that he must make no attempt to move the fore-arm alone. In the following exercises for the arm-movement this will be more fully explained.

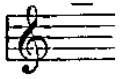
.The active co-operation of the upper-arm during a tremolo-movement was — to my knowledge — first described by Caland in the "Technische Ratschläge für Klavier-

spieler," published in 1902. This arm-action is there termed "die Schüttelbewegung" — the shaking movement. While the arm is "shaken," all intentional individual movement of the elbow-, of the wrist-, or of any of the finger-joints is debarred. Rapid alternation of pronation and supination of the hand (see Sec. 18) arising solely from rotary-action of the fore-arm, which the appearance of the notation of the passage would probably suggest, is not to be aimed at. The elbow-joint is therefore kept "braced." The wrist-joint also must be gently braced. The movement is originated by the action of muscles lying above and beyond the shoulder-joint. The following exercises will help the student to master the difficulties of this indispensable species of arm-vibration.

Ex. XCIV. Sitting at the piano, lay both hands in the lap, the palm of the right on the back of the open left-hand. Take particular notice of the angle at the elbow which the line of the fore-arm in this pose makes with the line of the upper-arm. With the elbow-joint, the wrist-joint, and all the finger-joints gently fixed, lift the right-arm about 8 or 9 inches out from the body. While the arm is held thus, the palm of the hand facing downwards, shake it from side to side rapidly and vigorously. The high speed of the movement restricts the latter to a comparatively small area, and makes the fingers present to the eye a blurred appearance. It will be noticed during this shaking-movement that when the thumb is moved towards the body the elbow is moved away from it. If the movement is executed correctly the student will be conscious of a rapid vibration of muscles of the upper-arm. The shoulder itself must move neither up nor down, and must be held loosely.

Practise this shaking-movement frequently and at first with both arms simultaneously. The speed of both must be equal.

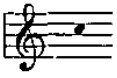
The movement must then be practised with each arm separately. The effort to execute it correctly with the left-arm alone may at first be found irksome. Consciousness of the vibration of the upper-arm muscles must be insisted on.

Ex. XCV. With the fifth-finger of the right-hand hold down  . Keep all the finger-joints, the wrist-joint, and the elbow-joint gently fixed, and raise the tip of the thumb four or five inches above the level of the keyboard, preserving the distance of an octave between the thumb-tip and the fifth-finger tip. The thumb nail-joint must be slightly crooked.

Let the student now think intently of the thumb itself, and, with the hand held as if "in one piece," execute a swift down-movement as if to strike C with the thumb — though without actually coming into contact with the key — instantaneously returning to the previous high pose of the hand. Each down-and-up movement must be made as swiftly as possible: at first about once a second, and afterwards at shorter intervals. During the stroke, the tip of the thumb describes an arc of a circle.

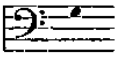
Practise the movement many times until the muscles of the upper-arm are felt to vibrate. As was said before, when the thumb makes its downward movement the elbow moves up and out from the body. The shoulder must be kept from rising.

The left-arm must then be similarly drilled — the fifth-finger holding down  .

Ex. XCVI. With the right-hand thumb hold down  . During the exercise, all the finger-joints, the wrist-joint, and the elbow-joint must be gently fixed, and the hand widened to the "octave" span. Raise the tip

of the fifth-finger four or five inches above the level of the keyboard, and thinking of this finger make a series of rapid downward strokes, the hand acting as if in one piece and with the finger nearly touching the key, in the manner described in the preceding exercise.

Let the student now think of the elbow, bringing it smartly towards the side whenever the downward stroke of the fifth-finger is made. It must return equally smartly to its out-pose when the finger rises — the two movements being made as one. The finger-tip describes an arc of a circle. The hand-stroke must at first be made once every second, and afterwards at shorter intervals. The shoulder itself must move neither up nor down.

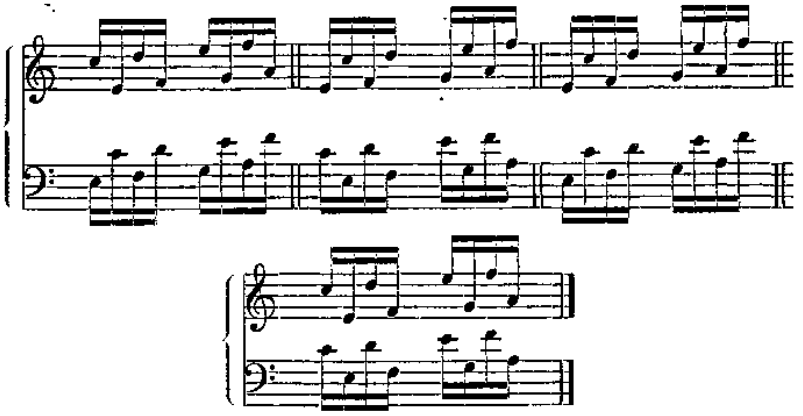
The left-arm must then be similarly drilled — the thumb holding down 

After the student has worked at the two preceding exercises with the shoulder held loosely, he must then re-study them with the muscles round the shoulder tense. This tension of the back, chest, and shoulder has already been described: Sec. 66.

In applying the movement described in the two preceding exercises to the practical execution of the tremolo, the tips of the fingers used in any passage must be kept as close as possible to the surface of the keys, and the arm shaken rapidly "as a whole" — the student being always conscious of the vibration of the upper-arm muscles. The wrist is gently fixed, and the shoulder-tension applied.

Ex. XCVII. The best material for practice of the tremolo-movement is furnished by the Scale — played in every key in "broken" sixths and octaves — and also the

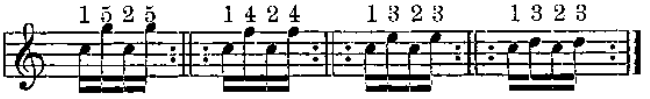
Arpeggio in some of its forms. Each of the following types of the scale in sixths should be carefully worked at.



The last two — being in parallel motion — will be found troublesome. Octave-scales must be treated similarly.

The frequent practice of these t r e m o l o exercises tends more perhaps than that of any other branch of technique to increase the player's volume of tone, as well as his power of endurance.

Ex. XCVIII. When two rapidly alternating notes have the interval of a fifth, a fourth, a third, or a second between them, as



it is not necessary to employ the t r e m o l o movement. The arm-rolling-motion may then be used, and each group of four notes may be played to an "ordinary" ellipse: the second pair of notes in each group showing a case of "irregular" fingering: see Sec. 48.

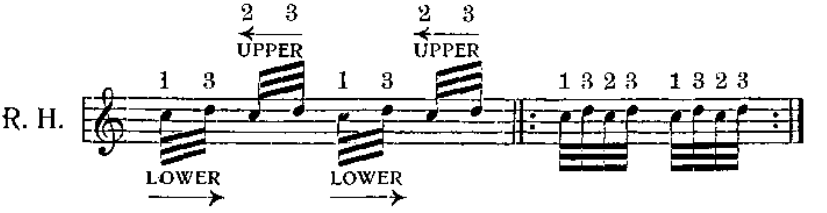
SECTION 91.

THE TRILL.

When rapid alternation of any two notes having between them the interval of a second — major or minor — occurs, the note-pattern is known as a "trill." For pianistic purposes the trill may be divided into two classes — (1) those which may be best played with the arm-rolling-motion, and (2) those for which the t r e m o l o arm-movement is more suitable.

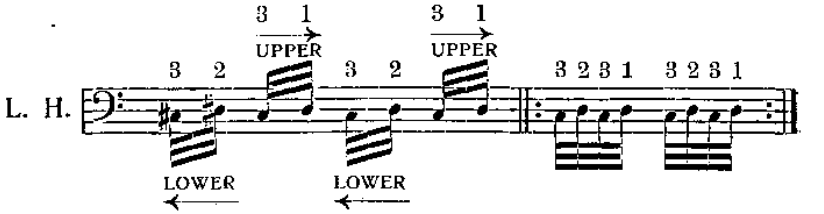
(1) To the former class belongs the trill in which both keys are either white or black. It is played in the following manner: —

Ex. XCIX.



This trill is played with t h r e e fingers, one of which is used twice in each group of four notes. The four notes of each group are played to the curve-lines of an "ordinary" ellipse: see Sec. 36, Ex. XIII. In the upper-curve will be seen a case of "irregular" fingering: see Sec. 48. During the trill, the hand is posed so that the line along the outside of the fore-arm and that along the outside edge of the palm may form a nearly straight line. The employment alternately of the first and second finger for the lower note in the above example allows the rolling-motion to be used; and this again makes the playing of the trill comparatively untiring to the hand and arm.

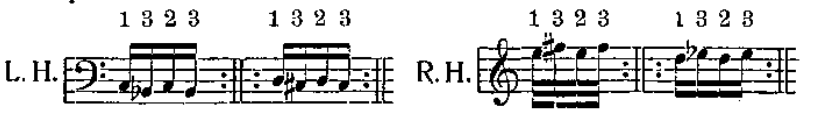
Ex. C. On account of the reverse "lie" of the two hands, the execution of the left-hand trill shows a slight difference.



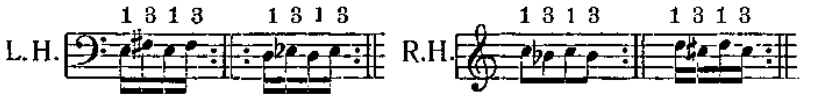
Although the four notes of the group are, as before, played to the curve-lines of an "ordinary" ellipse, it is now the lower-curve in which the "irregular" fingering will be seen. The outward-held pose of the hand (wrist) spoken of above must be maintained here also.

The student should practise the trill with both hands — the lower note of the trill with both hands simultaneously — in order to accustom himself to the unusual muscular sensation caused at first by the reversed nature of the curve-motions.

Ex. CI. When the trill contains both a white and a black key, a similar arm-rolling-motion is used — in the right hand when the white key is the lower of the two: in the left when the black key is the lower; as in the following examples:



Ex. CII. (2) When, in the right-hand, the black key is the lower, and in the left-hand is the higher of the two notes of the trill, the tremolo-movement — see Sec. 90 — is then necessary: as in the following examples.



During the execution of these there will be noticed a rapid rotary-action of the fore-arm.

In choosing the amount of tension suitable for the trills, the student must carefully study the requirements of his hand, and listen closely for equality between the two tones. The peculiar "backward" fingering given for the last two examples obliges the hand to adopt the pose (relative to the line of the arm) described above. The "crook" of the thumb nail-joint will often be found helpful: see Sec. 70, Ex. LI.

As regards the choice of fingering for a trill played with the tremolo arm-movement, much will depend on (1) the individuality of the student's hand, (2) the peculiarity of the passage to be played, and (3) the trill's situation on the keyboard.

(1) The Individuality of every hand.

For many players the trill made with two neighbouring fingers is easy: the naturally most difficult combinations being 3 with 4, and 4 with 5. And to a few players even these give comparatively little trouble. But there are many who, in spite of their most careful efforts, are incapable of ever learning to make a really good trill with these two pairs of fingers. The impossibility of making the fingers become all of equal strength by teaching them to act as hammers on the keys, is, in this case, obviated by selecting for the trill a favourable fingering from the ten two-finger-combinations possible to the hand. These combinations — all played with the tremolo-movement — are: 1,2; 1,3; 1,4; 1,5; 2,3; 2,4; 2,5; 3,4; 3,5; 4,5.

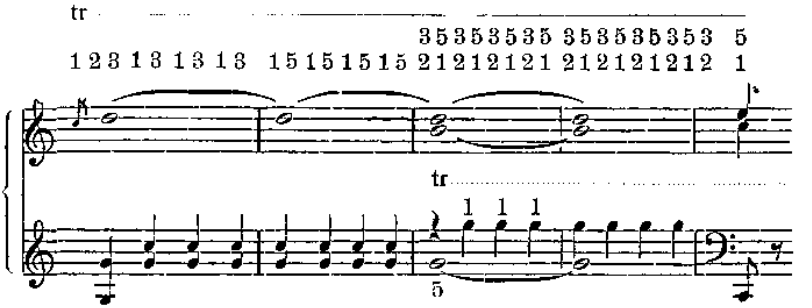
Of these, the best for the trill with both keys either white or black are, the 1st, 2nd, 5th, 6th, and 9th.

For the trill with a white and a black key, the above combinations are all good, except the 8th and 10th. A cor-

rect choice will depend also on whether the white or the black key is the lower of the two, and on whether the trill is played by the right or the left-hand.

(2) The peculiarity of the passage to be played.

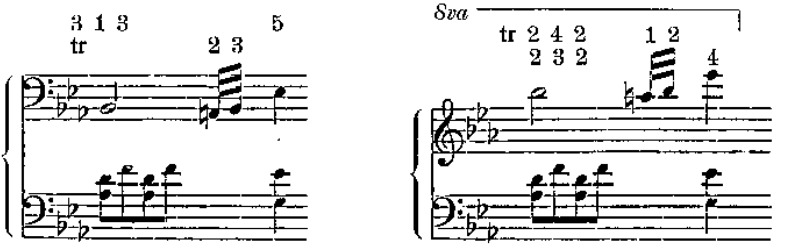
An example of this from Beethoven, Op. 53, is given:



The trill in the third bar was written to be played by both hands. It is here given to the right-hand alone, and accordingly has to be prepared for by arranging the fingering to suit. The repeated G in the third and fourth bars — originally written for the right-hand — is here given to the left.

(3) The trill's situation on the keyboard.

The different aspect which the same trill when played at various parts of the keyboard presents to the hand, and the consequent change of fingering necessary, are shown in the following example:



In bringing to a close this attempt to further the science of piano-teaching, I may be permitted to express the hope that those players who are anxious to test their present knowledge of the intricacies of the piano by studying the principles of the Arm-Rolling-motion will do so only after they have gone through a certain preliminary training. They ought first to make sure that they have eliminated all unnecessary exaggerated contraction of the muscles of the hand and of the upper-muscles of the fore-arm. This faulty condition is often the result of a long-continued conscientious use of the fingers as HAMMERS. Until the effect of this treatment has been got rid of, and these muscles have been taught to act more passively and with a s t i l l arm, the player will not be in a condition to benefit fully by a study of the arm's Rolling-Motion.

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