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Norris, Christine Coates

THE USE OF A VIDEO CAMERA AND RECORDER AS AN AUDIO-VISUAL AID IN THE TECHNICAL STUDY OF "FUR ELISE" BY BEETHOVEN

The Ohio State University

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THE USE OF A VIDEO CAMERA AND RECORDER AS AN
AUDIO-VISUAL AID IN THE TECHNICAL
STUDY OF FÜR ELISE BY BEETHOVEN

DOCUMENT

Presented in Partial Fulfillment of the Requirements for
the Degree of Doctor of Musical Arts in the Graduate
School of The Ohio State University

By

Christine Norris, B.A., M.Ed., M.M.

* * * * *

The Ohio State University
1982

Reading Committee:
Professor Sylvia Zaremba
Dr. Jerry Lowder
Dr. Rosemary Platt
Dr. Marshall Barnes

Approved By

[Signatures]
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I wish to express my deep gratitude to Professors Sylvia Zaremba and Richard Tetley-Kardos for their able assistance in the preparation of the musical programs and to Professor Jerry Lowder for his editorial guidance in the writing of this paper.
VITA

September 21, 1935........... Born-Helena, Arkansas

1957.............................. B.A., University of Mississippi
Oxford, Mississippi

1957-59........................... Teacher, Wilkinsburg Pre-school for
Retarded Children, Wilkinsburg,
Pennsylvania

1959.............................. M.Ed., University of Pittsburgh
Pittsburgh, Pennsylvania

1959-60........................... Teacher, Wilkinsburg Public Schools,
Wilkinsburg, Pennsylvania

1960-64........................... Teacher, Columbus Public Schools
Columbus, Ohio

1967.............................. Debut Piano Recital, Town Hall, New
York City

1971-80........................... Soloist with orchestra: Gulf Coast
Symphony, Capital Symphony, Arkansas
Symphony, Jackson Symphony, Memphis
Symphony

Recital appearances in East and Midwest

PIANO STUDY

1968-69........................... Grant Johannesen, New York City

1971-75........................... Andriuss Kuprevicius, Cleveland, Ohio

1977-80........................... Richard Telley-Kardos, Ohio State
University

1980-82........................... Sylvia Zaremba, Ohio State University
This recital is presented in partial fulfillment of the requirements for the degree Doctor of Musical Arts

PROGRAM

Sonata in A minor K. 310
Allegro maestoso
Andante cantabile con espressione
Presto

Etudes Symphoniques Op. 13

INTERMISSION

La soiree dans Grenade
Jardins sous la Pluie

Sonata #3 in F# minor Op. 23

Drammatico
Allegretto
Andante
Presto con fuoco

Wolfgang Amadeus Mozart
Robert Schumann
Claude Debussy
Alexander Scriabine
This recital is presented in partial fulfillment of the requirements for the degree Doctor of Musical Arts.

LOUIS M. GOTTSCALK
LECTURE-RECITAL PROGRAM

The Banjo (Fantaisie Grotesque) Op. 15
Le Bananier (Chanson Nègre)
La Savane (The Savannah) Op. 3
Bamboula (Danse de Nègres) Op. 2

INTERMISSION

Souvenir De Porto Rico (March of the Gibaros) Op. 31
Pasquinade (Caprice) Op. 59
The Last Hope (Meditation Religieuse) Op. 16
L'Union (Paraphrase de Concert) Op. 48
Sur les Airs Nationaux
III

ELENA BERGEN, violin
SUSAN CONDEN, flute
MARIANNE KAITSA, soprano
CHRISTINE NORRIS, piano

This recital is presented in partial fulfillment of the chamber music requirement for the degree Doctor of Musical Arts for Ms. Norris.

Program

Der Hirt Auf Dem Felsen, Opus 129
   Schubert

Sonata in c minor, Opus 45
   Allegro molto ed appassionato
   Allegretto espressivo alla Romanza
   Allegro animato

Sonata
   Allegro malinconico
   Cantilena
   Presto giocoso

F. Poulenc
This recital is presented in partial fulfillment of the requirements for the degree Doctor of Musical Arts

PROGRAM

Rondo, A minor, K. 511

Sonata No. 21, C major, Op. 53

Allegro con brio
Introduzione: Adagio molto
Rondo: Allegretto moderato

Le Tombeau de Couperin

Prélude
Forlane
Menuet
Rigadon

L'Alouette

Islamey, Fantaisie orientale
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INTRODUCTION

In his book *Famous Pianists and Their Technique*, Gerig writes that:

Naturalness is, without a doubt, the final determinant of a valid piano technique. Such a technique operates in harmony with the laws of nature—*with a special regard for those laws concerned with physiological movement and muscular coordination.*

Naturalness implies freedom in movement, and the aim of all technical study for pre-college students should be the release of any muscular tension that would hamper ease, inhibit facility and thereby restrict enjoyment and artistic expression. This assumption is valid at any level, from the beginning pianist to the most advanced.

Last writes "that it is important for teachers to be able to analyze technical movements, detect faulty muscular action, and build a secure technique for their pupils." Traditionally teachers have relied on verbal communication coupled with personal demonstration in order to convey basic technical information to their students. However, in contrast to visual learning, information delivered vocally is more time consuming and often not as efficient. Gattegno writes:

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Sight is swift, comprehensive simultaneously analytic and synthetic. It requires so little energy to function, as it does at the speed of light, that it permits our minds to receive and hold an infinite number of items of information in a fraction of a second. ... But only recently through television has he (man) been able to shift from the clumsiness of speech (however miraculous and far reaching) as a means of expression and therefore communication, to the powers of the dynamic infinite visual expression, thus enabling him to share with everybody immense dynamic wholes at one time.  

If television technology can play a basic role in education, what then are the implications for pianists in adapting this medium to the study of technical and performance problems?

In a recent article, "Videotaping: New Views of Tradition," Burmeister writes:

Classical musicians are gradually making use of technology to aid in the perfection of their work. Specifically, audio-visual media can assist a student to perceive performance problems and to define possible solutions to them. ... With appropriate guidance, such media can allow the student to be his/her best teacher; at the very least, the student is implicitly involved in clarifying the issue being confronted.

The idea for using a video camera as an analytic tool in the teaching of technique came spontaneously to the writer several years ago. It evolved from experimentation in the use of mirrors, the first being attached to the piano fallboard, the second a free-standing full length mirror positioned at the student's side. As technology in the consumer market advanced, the price decreased, the equipment became more reliable, and so private ownership was feasible. Consequently,


the decision to proceed with the purchase of the video camera, recorder and monitor seemed a logical step in series of explorations into enhanced learning through increased visual awareness.

There exists a vast amount of research literature concerning teaching by television. Many applications also have been made to music instruction via television. However, there is a dearth of published research regarding the use of the video recorder in applied music lessons. Two articles exist, however, that lie close to the writer's intent for the use of the equipment.

Kaplan writes:

The skillful use of the video recorder in applied music lessons improves the student's ability to concentrate, maintains his attention, builds his self-confidence and greatly increases his motivation... a videotape recorder has been used successfully to correct bad performance habits such as extraneous throat movements, breathing problems, incorrect embouchure and lifting fingers too high off the keyboard.5

Erling writes:

Television can show piano technique in action in normal time sequence or in slow motion, from any desired angle or distance-to focus attention on specific points and to intensify students' mental imaging of the tactile-kinesthetic responses. Close-ups of hand positions, finger technique and wrist action dramatize many particulars that are not easily observed under ordinary circumstances... thus the amount of instructional time that had to be devoted to technique was reduced.6


Three dissertations and one article were found on the use of the video recorder as a teaching tool in the areas of conducting, teaching technique to cello and violin students, problems encountered in oboe playing, and self-instructive techniques via videotape for double-bass players. No study was found that pertained specifically to the use of the video camera and recorder in the solution of technical problems for piano students.

The following is a report on how television equipment was used as a teaching tool in the solution of technical problems encountered in the study of Beethoven’s "Für Elise." It is based on the assumption that muscular freedom, ease, and lack of physical restraint are basic to good piano technique and to the musical and artistic rendering of a piano work. Further, the writer contends that a video camera, recorder, and monitor can be indispensable tools in detecting and correcting faulty muscular action and developing new technical skills.

The first section of the report will be devoted to a description of the technical aspects of the equipment, lighting requirements, and

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7George L. Jorden, "Videotape Supplementary Instruction in Beginning Conducting," (Ed.D. dissertation, University of Illinois at Urbana-Champaign, 1979).


the various possible positions for the placement of the video camera and the television monitor. The second section will deal with the technical problems encountered in the teaching of "Fur Elise" to pre-college students and the manner in which the video recorder contributed to the successful solution to these problems. Part three will summarize and evaluate the work done with the video recorder in the past two years.
CHAPTER I

Description of the Equipment

The studio used for this project was a room measuring 17.5 by 30 feet. Because the area was windowless, all lighting had to be provided by artificial means. Good lighting, with recommended a minimum of 100 lux, is essential to the projection of a clean, sharp, shadowless image on the television monitor. Absence of sufficient light intensity produces a see-through, ghost-like appearance on the monitor. In addition, lack of adequate lighting can cause fixed striped patterns to appear on the screen which interfere with the viewer's clear perception of the image on the monitor. In the studio, three banks of fluorescent lights, each with four 40-watt tubes, were equally divided down the length of the room. Two 150-watt flood lights were positioned above the two grand pianos. This combination was adequate to produce a clear, sharp picture on the television monitor.

The video equipment used in this study was non-commercial and of the type produced for home use. The video recorder was a JVC HR-6700-U NTSC-type with the standard VHS format and required 1/2 inch tape. The recording system was composed of a rotary slant azimuth two-headed helical scan system with two pairs of video heads. Each
pair was used exclusively for either the standard play or extended play mode. The extended play mode was effective in the conservation of tape, especially when time-lapse taping was undertaken, and the slower mode was not found to reduce significantly the clarity of the television image or to affect the frequency range of the audio portion. The tape speed for standard play was 1.31 inches per second and .43 inches per second for extended play. Maximum recording time on standard play was 120 minutes and 360 minutes on extended play. The equipment used ordinary 120 V AC 60 Hz house current, and the power consumption of 55-watts per hour made it economical to operate.

The video signal input ranged from 0.5 to 2.0 Vp-p, 75 ohms unbalanced, while the output measured 1.0 Vp-p and 75 ohms unbalanced. The signal to noise ratio was more than 45 dB and the horizontal resolution more than 240 lines.

The recording unit was equipped with a 6-function remote control unit that could be operated from a maximum distance of 16 feet away from the base. The pushbutton controls include a still function, tape pause, speed play and slow motion variable from slow to fast, as well as normal play mode. The remote control unit was an indispensable tool which allowed the instructor to sit with the student at the keyboard and to change the tape function as needed. For instructional and study purposes, the still frame and slow motion modes were most frequently utilized.

The audio input signal for the use of an auxiliary microphone measured -67 dBs, 10-k ohms unbalanced while the line input was found to be -20 dBs, 50-k ohms unbalanced. The output level was -6 dBs high
impedance load, the output impedance 1 k-ohm unbalanced, signal-to-noise ratio more than 40 dB and the frequency response 50 Hz to 10,000 Hz.

The dimensions of the recorder unit measured 18-1/2 wide x 5-13/16 high x 13-3/4 deep. The overall weight of 31 pounds allowed for some portability.

The video camera used in conjunction with the recorder was a JVC GX-66U single-carrier frequency multiples system. The pick-up tube was single tubed, 17 mm (2/3") and had electrostatic focus and an electromagnetic deflection vidicon tube. The scanning system contained 525 lines with 2:1 interlaced NTSC-type output.

The camera was equipped with an f/1.9 6X zoom lens (f= 12.5-75 mm), auto-iris control and a 55 mm filter diameter. The through-the-lens optical viewfinder allowed split-image focusing with dippter adjustment. Color compensation by means of manual adjustment was possible by switching from indoor/morning to evening/outdoor modes.

The video output of the camera was 1 Vp-p, 75 ohms, and the omni-directional built-in electret condenser microphone registered -64 dB/1-k-ohm. The audio output was -20 dB, with low impedance and the horizontal resolution of 250 lines. The video signal-to-noise ratio measured 45 dBs. The power consumption was minimal, 12 V DC 7.5-watts. Total portability was insured with an overall weight of 3.3 pounds. A 10-foot connection cable was standard with this model. A 20-foot extension was added to provide greater flexibility in taping with a 30-foot radius from the base unit.
The television monitor was a standard Sony Trinitron color receiver model K-V 1912. The monitor was placed on a 54" Pix-Mobile television stand which was high enough to allow the image to be viewed clearly when the subject was seated at the keyboard.

The camera was mounted on an adjustable Argus tripod, model GB-3, with the capacity of variations in height from 2 to 5 feet. The most common placement for the camera was at the end of the keyboard, facing across the keys at right angles. In this position, the operation of both hands, encompassing the total length of the keyboard, could be viewed. As the height of the camera was decreased, the viewing area was diminished, permitting focusing on a localized area for study. With the camera placed in its lowest position behind and slightly to the student's side, it was possible to view the descent of the key into the keyboard.

Depending on the study requirements, the placement of the camera could be continually readjusted in height and angle until the exact position was found. In general, the rear positions gave the best views of observing the rotary freedom of the upper arms in the shoulder joints and the easy abduction and adduction of the arms across the expanse of the keyboard. From the side position, the student could see the alignment of the head with the upper body and the flow of the torso as it followed the movements of the hands and arms.
CHAPTER II

Technical Analysis of Für Elise

Beethoven's "Für Elise" was chosen for this investigation because of the wealth of technical challenges contained in its various contrasting sections. In addition, the composition has retained an almost universal appeal to all students, regardless of age or sex. As the number of students continuing piano study diminishes rapidly after advancement to the intermediate level, the opportunity is present to study this work, with all its technical and musical challenges, and to solve these problems by means of television technology. This study may well prove to be the culminating experience for many students as they learn to deal with musical and technical problems by seeking physiological solutions.

One technical problem which many beginning piano students encounter in the opening bar of "Für Elise," is their habit of compensating for the weakness of fingers 4 and 5 by holding the thumb in an elevated and rigid position in an effort to establish hand balance. This problem is encountered in bar 1 when fingers 4 and 5 of the right hand are required to execute the beginning of the opening theme. By placing the camera in the high position to the right and slightly behind the student, it is possible to observe the overbalancing of the
hand on the television monitor. Once the problem has been identified, a solution can be offered in the following manner.

Owing to the difference in length between fingers 4 and 5, finger 5 on E must be placed close to the foot of the black key D-sharp, and finger 4 must be placed close to the front edge of the black key D-sharp. This allows the difference in finger length to be compensated for by the correct placement of the two fingers on their respective keys. The weight of the hand can then be balanced over the respective fingers and shifted ever so slightly in forearm pronation and supination as the figuration alternates between E and D-sharp. Only in this way can evenness of tone be assured and the indicated swell in dynamics toward the center of the figure, be accomplished.

Having successfully led the student through several repetitions of the correct procedure, it is important for the teacher to withdraw for a short time to allow the student an opportunity for private practice. By utilizing the television monitor, the student can experiment and make adjustments until the technique of balance, positioning, and weight transference is thoroughly understood. During this
time, the teacher may readjust the focal length of the camera lens, according to need, so that the operations of the fingers, hands, and arms can be studied in greater or lesser detail. Although it will not be mentioned in subsequent analyses, the repositioning of the camera and the change in focal length of the lens, with its zoom capacity, will always be a viable alternative to the study of a particular technical problem and its resulting solution. Also, the teacher may tape the segment under consideration, either during the initial instruction period or during the student's practice time. Video taping with the still-frame and slow motion remote capacity, provides the opportunity for a particular problem to be assessed in many ways, should the initial solution prove unsuccessful.

It is not uncommon to hear students play over rests, as in bar 2 when the right hand opening motive is concluded on the first beat.

Ex. 2

Invariably this note is elongated by one-half beat. From the same camera angle, students can observe that the key remains down beyond the value of the note. In addition, the conclusion of the opening motive should be finished with a weight-off, rolling-wrist motion toward the fallboard. As the thumb is the concluding finger in the
passage, it needs to be held in the high position with a firm tip in ready contact with the key. When the elbow displaces forward, following the upward motion of the wrist, this action will cause the thumb to depress the key and release it on the roll off. Thus the problems of weight and duration will be solved simultaneously.

The left hand in bars 2 through 8 presents two problems for study. The camera can be positioned at medium height to the left and slightly behind the student. Focal length of the lens should be set to encompass the two octaves below middle C. The first figure is found in the opening three 16th notes of bar 2. (See Example 2.) It is executed with a rolling hand motion in which the weight of the hand is transferred successively from the 5th finger side of the hand, rolling over the 3rd finger and finishing on the thumb. The finish stroke of the thumb is carried out in exactly the same manner as previously described for the right hand. Students attempt to play this passage with a flat lateral motion, which fails to give weight stability to the fingers and often results in uneven tone production. The second figure of this passage encompasses a tenth rather than an octave and requires finger 2 of the left hand to be rolled over the thumb. This movement gives many students considerable difficulty. First, the roll over of finger 2 must be accomplished with an economy of motion. The thumb must not be released until the tip of finger 2 has reached G-sharp. G-sharp must be played with the fingertip rather than the swing of the whole finger which results in a slap of the key. A slapping motion offers little control and often results in either misplacement or a missed note. In traversing the interval of a 10th,
often the first experience of this kind for the student, the forearm must follow the fingers smoothly as they move across the keys with an easy, gliding motion. As the thumb reaches the keybed and finger 2 prepares to cross over, the wrist leads and the motion in the treble direction ceases only when the natural follow through has been completed. Students can observe either by tape or on the monitor mode when follow through, so necessary to the harmonious flow of the hands and arms, has been stopped prematurely. This often occurs in haste to begin the next figure, or when the elbows and forearms are held in a rigid position at the sides and do not follow freely the direction dictated by the fingers.

In bars 13 and 14, the right and left hands have successive octave figures which must be carried out with uniformity in the four repetitions (Example 3). The movement drops on the lower notes and concludes with a pick-up touch on the higher note with the wrist leading.

Ex. 3

The problem this presents to students is that while the left hand finger 5 initiates the movement, it is the thumb in the right hand which commences the identical movement. Finger 5 may move the key with a fingertip action, but the same movement with the thumb involves a
different set of muscles. While students may not understand the
muscular differences concerning these movements, they do feel the dif-
ference and can hear the difference in tone production. They find it
difficult to synchronize motion that proceeds from opposite ends of
than hand. By placing the camera at either the right or left end of
the keyboard and looking downward at right angle to the keys, students
can assess the uniformity of their hand and arm motion as the figura-
tion is transferred from hand to hand. By visual observation, neces-
sary adjustments can be made until a unison effect is achieved.

In bars 10, 11, 12 the right hand figuration now concludes
with a dotted 8th note rather than the previous 8th note value (Example
4). Having seen the similar figure in bar 3 and beyond, many students

miss the difference in technique required by the elongation of the con-
cluing note by one-half beat. Instead of employing a weight off
pick-up touch, now the finger must control the descent of the key into
the keybed so that the strength of the pitch is maintained for the
duration of the note. When the camera is placed at keyboard level, to
the right or left of the student and facing the front side of the keys,
the speed of the descent of the key into the bed can be observed. In working with the video monitor, students soon learn that a rapid key descent, which they can see from this camera angle, produces a louder tone than a slow descent. Weight also affects the amount of volume produced when combined with speed of descent. While it remains a matter of artistic judgement as to how much weight and speed are required to execute the dotted 8th note in proportion to the preceding 16th notes and those beyond, the physical control of the key that produces the sound is always a matter of technical skill which can be enhanced by visual observation of the playing apparatus in the manipulation of the key.

One of the major problems in teaching pre-college students, especially at the early level, is to train them to think before they play. Part of the responsibility of the teacher, to students who advance to the intermediate level and beyond, is to gradually expand their awareness from total aural dependence to include other factors of musical performance. A basis for developing good musicianship is the balance of the visual, tactile, aural, and intellectual capacities coupled with an ever increasing knowledge of the highest musical traditions that have been handed down to us by preceding generations of pianists.

Two examples of this appear in bars 24-25 (Example 5). To the "average" student there seems to be little need for exact and musical rendering of the portamento touch required in bar 24 or for the change of fingering 4-1 in bar 25, beat 1, of the right hand. In the past the writer had limited success in explaining the purpose for the portamento,
either by visual demonstration or the suggestion that perhaps the change in touch was used to emphasize the entrance of a new theme, like a different character about to appear on stage. Today's students seem much more visually oriented than students of past generations and can often be guided into the correct approach by visual conditioning. Greater success has been attained by the writer in teaching these fine points by having the students observe what they do, either on monitor function or on tape, rather than by demonstration alone. Their innate curiosity in viewing their movements will result in longer and more productive practice sessions in the perfection of the required technique. The visual impressions created in these practice sessions set up in the student's mind a pre-condition for the three successive pick-up touches that produce the portamento or the 4-1 finger changes that maintain the legato line. Thus the student's awareness has been expanded, and he has been conditioned for the appropriate action before the movement takes place. In total aural dependence the evaluation can be made only after the action has been completed.

For the left hand accompaniment in bars 25-31, the camera is again placed in the low position, behind and to the left of the student
so that the descent of the key into the keybed can be observed (Example 6). It is the writer's belief that in order to produce an accompaniment figure that is not too loud and overbalances the right hand figuration, the student must strive for an overlapping of the key release combined with a slower descent of the key into the keybed. Both of these operations lend themselves well to visual observation. As finger 5 of the left hand initiates the figure in the bar 25, it must be held in the keybed until finger 3 is down and only then slowly released. If finger 5 releases too soon, and subsequent fingers do likewise, the continuous sound of F Major is lost. Similarly, if the movement of 1,3,5 into the keybed is too fast, more sonority than is required will result, and the left hand will overbalance the right.
Students are often asked to play with a softly contoured hand as opposed to the more active right hand which attempts to pull an intense sonority out of the piano by increased finger activity. While it is not possible to visually monitor the intensity of right hand's execution, as this is more a tactile sensation, it is possible to observe on the television monitor the overlapping and speed of descent of the left hand keys.

Within this same passage, bars 25-31 (see Example 6), is contained two sets of 32nd-note turns for the right hand. Most students approach notes of rapid execution by attempting to get across the keys as quickly as possible, usually resulting in excessive and uncontrolled finger movement. Strict economy of motion is required here, as the swifter the passage work, the closer the finger must be to the key so as to be held in readiness for action at all times. By positioning the camera in the high position 45° to the right of and slightly behind the student, it is possible to view clearly the two-octave range above middle C. The student is asked to keep his hand in the closed hand position with every finger held in readiness above the note it is to play in the execution of the turn. The hand itself must be set in a firm but not rigid position so that each finger will have a stabilized base from which to move and that the movement of one finger will not cause that of another to overbalance the hand. A swift light action of the fingertips is required in the execution of turns, and students are asked to gradually perfect their movements so that there is very little perceptible motion viewed on the monitor when delivery
is done correctly. While fingertip action is not as readily observ-
able, this action must emanate from a controlled, stabilized hand that
allows the fingertips to rest confidently and in a state of prepared-
ness on the surface of the keys. This readiness of the finger on the
key of a stabilized hand position lends itself well to improvement by
visual observation, while the development is better sensed by tactile
acuity in which the resulting sonority is monitored for correctness.

The right hand 32nd-note passage, bars 32-36, contains two dis-
tinct technical problems (Example 7). The first involves the rotary

Ex. 7

motion, pronation, and supination upon the firm fingertip that is kept
as closely as possible in contact with the key. Growing students of
intermediate level present varied challenges in dealing with this
problem with regard to hand size, flexibility, and motor control. With
the camera placed slightly behind and to the right of the student, focused on the two octaves above middle C, the gradual modification and refinement of the rotary movement may be undertaken. The most common mistake encountered in this passage is when the student engages in too much hand motion or too much finger activity. The rotary motion is not subtle enough for the speed required or the fingertips do not remain in close contact with the keys. The still-frame and slow motion functions of the video tape replay mode are most instructive in this regard. The replay mode allows the student to see if overuse of the rotary principle has caused the fingers to lose contact with the keys, thus hindering velocity and accuracy in some cases.

The second technical problem may be found in bar 33, which contains the scale passage, the rollover of finger 3, and the change in direction within the passage work (see Example 7). Required here is a stabilized, closed hand position in which every finger is held in active readiness above the key. As finger 5 reaches high C, the thumb, which initiated the passage, must be positioned over F well ahead of the time it will be needed in the passage. As the thumb plays F on the third 32nd note of beat two, it must remain fixed on the key bed until finger 3 has completed the rollover and is firmly fixed in place on E. In any change in hand position, the concluding finger must act as a stabilizing point for the initiation of the new position and must not be released until the new position is set.

The change in direction required in the concluding 16th notes of bar 33 must result in an easy participation of the forearm as it accommodates the fingers in the movement shift from right to left. Many
students hold their forearms and upper arms rigid and close to their sides so that finger activity is hampered, especially as it begins to take place over greater expanses of the keyboard. While muscle participation cannot be monitored by video, it is possible to study the resulting movement and to judge fluency and harmony by what is seen. Different sets of muscles are used for adduction and abduction of the arm to and fro across the keyboard. Change in direction dictates a needed awareness of the change in muscle participation so that contraction of the unneeded set does not restrict or hamper the movement of the set currently in operation. With this knowledge, students can assess how the movement feels and how it looks by visual observation, thereby combining the two sensory perceptions in the perfection of a greater fluency.

The left hand in bars 32-36 uses a combination of the portamento and legato technique previously described (see Example 7). With the camera positioned to the left and slightly behind the student, the observer can see on the television monitor the operation of the left hand in the octaves above and below middle C. Care must be taken in positioning the camera for any operation that takes place on the keyboard directly in front of the student. The writer found that the best position was about $65^\circ$, right or left, with the lens focused downward from the highest position of the tripod.

For the execution of the portamento, the student needs to watch on monitor or tape mode his left hand make three separate and distinct moves. Each chord of bar 32 is played with a pickup motion of the wrist which, as it rolls forward and upward, will cause the fingers to
depress the keys, if the tips remain firm. As each movement is completed, the wrist returns to the level position and initiates the next move. In this way just the right amount of separation of sound for the portamento is achieved. In portamento chords, not only is separation of sonority desired, but also the equalization of finger length is so necessary that all chord members are depressed simultaneously. The camera must be lowered on the tripod to keyboard level to monitor the operation of equalized depression. In bar 33 the portamento touch gives way to legato thirds which are best executed by equalized finger length and the holdover technique described earlier. This procedure, like the previous one, is best monitored by observing the front of the keys when the camera is in the lowest position. For most young students, the exact, simultaneous depression of two or more keys at once is difficult, owing to the lack of equal strength of the fingers and occasional placement problems. The ability to see key displacement at the moment the movement takes place has proved to be a decided advantage in helping students cope with the problem of chordal unity.

Most editors recommend a change in fingering for the left-hand figuration in bar 61 (Example 8). The writer's experience has shown

Ex. 8

\[
\begin{array}{c}
3 & 2 & 1 & 3 & 2 & 1 \\
\end{array}
\]
that this is a difficult technical problem for most students of the intermediate level. In order to execute a 321321 shift on the same key, the hand must be kept in the closed position, and the fingers must rest on the key surface. As each finger plays alternately it must be placed as close as possible to the point on the key surface where the previous finger was located. The thumb must be placed in the high position so that it remains at the level of the fingers, with its tip angled in so that it rests directly behind fingers 2 and 3. If this operation is undertaken, it can best be viewed from a 65° angle to the student's right, with the camera placed in the medium position and zoomed in to show the three participating fingers in great detail. Another alternative is to choose either thumb or fingers 2 or 3 and carry out the repetitions by flexing the wrist. For this movement, the finger must remain in contact with the key at all times. If the fingertip remains firm, the downward displacement of the wrist, coupled with pliability of the knuckle joints, will cause the key to be depressed. The same sensation may be felt when one bounces a ball. Because most students already have firmly fixed in their sensory memory the notion of how to bounce a ball, this technique has been found to be easier to teach to most students than the one requiring a finger change. The camera can be placed at the bass end of the keyboard facing downward at right angles to the keys. As the entire arm apparatus is involved in this movement, focal length of the camera should be set to include the entire arm from the shoulder to the fingertip. The student should first look to see that the fingertip is firm rather than spongy, and that the finger always remains in contact
with the key. Lack of firmness in the tip will cause uneven repetitions. Next, the flexibility of the knuckle area and the wrist should be monitored for suppleness and bounce. If the muscles of the upper arm are not tensed, the elbow and shoulder joints should follow the hand and wrist action freely. The appearance of the whole operation will be that of unrestricted freedom and rhythmic bounce.

The right hand chord figuration in bars 62-77 gives many students considerable difficulty (Example 9). As described previously, the problem of ragged attack and lack of unity of tone production within the chord is due primarily to differences in finger strength
and placement problems. The opening chord, E, G, B-flat, C-sharp, must be played so that the tip of the shortest finger 5 is placed directly on the forward edge of C-sharp. Finger 4 will rest just far enough back on B-flat to allow the tip to be perpendicular to the key. It is the tip placement at right angles to the key that compensates for unequal finger length and allows notes to be played simultaneously. Finger 2 is similarly placed, and the thumb is kept in the high position in order not to overbalance the hand to the thumb side, thus causing the hand to tilt to the left. As stated earlier, equality and simultaneity of attack is best viewed from key level with the camera facing the front of the keys. Placement can be monitored best from the treble side with the camera in the medium to high position, focused downward and at right angles to the keys.

The growth in dynamic intensity over bars 62-65 (see Example 9) presents another problem for consideration. The crescendo needs to grow evenly in tone production so that the longer eight-bar phrase is emphasized. Students often vary the origin of attack by a sudden push from the arm when only finger and hand action has been previously used. This sudden change in tonal production destroys the continuity of the long melodic line. The crescendo can be executed evenly in the easiest manner by the displacement of the wrist downward to a low position on the strong beats. More weight is added so that the sonority increases as the key is moved more quickly into the key bed. The upbeat chords are played with less weight and less wrist motion while the key moves more slowly into the key bed. In this way, rhythmic proportions of strong and weak beats are maintained. Because it is important to view
the totality of the arm length from fingertip to shoulder, the camera is placed at right angles to the student in the medium position facing his right side. From this position it is possible to view the downward thrust of the wrist and the free participation of all supporting parts. The forearm, elbow, and upper arm must in no way impede or restrict the movement of the wrist but must follow easily whatever direction it takes.

Fingering in bars 63, 66-69, 74-77 (see Example 9) for the right hand should be followed closely for the maintenance of legato. The writer's experience has shown that students at this level of technical development have to be impressed with the need for precise fingering practices in order to maintain tonal continuity within the phrase. Students are first asked to play the melody in the top voice with the suggested fingering, followed by the monitoring of this procedure on the screen. The visual impression of certain fingers on particular keys, combined with aural sense of sound continuity, will strengthen the students' understanding of legato. Small hands will have to take all lower-voiced right-hand notes with the thumb, as the suggested 3-1, 5-2, 4-5-1, 3-1 execution in bar 68-69, is beyond their capabilities. In order to bring out the soprano line in this passage, the hand balance is shifted slightly toward the right, and the upper voice keys are played more vigorously so that the melodic line stands out clearly. The camera is placed to the right of the student, and the lens is set to focus on the hand. From this position the student may monitor the weight distribution in the back of the hand and the activity of the upper fingers on the keys. It is the energetic pull of these fingers
as they activate the keys, combined with the increased weight from the shift in hand position, that causes the melodic line to be heard distinctly over the other voices. The lower voice, played exclusively by thumb or thumb-second finger, must be monitored from the bass side of the piano with the camera focused on the lower fingers. The shift in weight of the back of the hand toward the right should not result in the thumb being drawn upward from the surface of the keys. The movement of the thumb across the surface of the keys should be viewed as an easy gliding motion and as one in which surface contact is always maintained.

In bars 66-68 (see Example 9) the single note repetitions give way to double notes for three bars. The technique involved is the same as for single repetitions, except that the balance of the hand becomes crucial when another note is added to the figuration. Balance can be observed by watching the back of the hand. In 5-1 finger combinations, many students are prone to drop the thumb on its side, causing the back of the hand to be tilted downward toward the thumb side. In this instance, the thumb should always be played in the high position with the tip angled toward the hand. Only the right tip of the thumb comes in contact with the key, and in this way hand balance and even tone production is assured. This operation must be viewed from the treble side of the keyboard with the camera placed in the high position and focused downward on the left hand. The still-frame function is particularly helpful in developing balance, as the tape may be stopped exactly at the moment when the hand collapses, and the student is immediately aware where the problem lies.
The passage included in bars 79-84 presents a technical problem for both hands (Example 10). The more difficult one occurs in the arpeggio figure of the right hand. In executing this passage, the writer has observed that students invariably lower their hand height to accommodate the shortness of the thumb, fail to hold down finger 3 until the thumb has passed under and reached the new key, and that they allow the forearm to be drawn upward in a big jerky motion when the thumb passes under the hand. The latter fault is readily noticeable on the television monitor, and students are often amused when, in the midst of a passage that began smoothly and evenly, a sudden jerk of the whole arm is observed, resembling the flap of a wing. At once it is recognized as not only excessive movement, but also as one totally out of proportion to the requirements of the arpeggio figuration.
Students can be asked to first assess the movements of the thumb. By experimentation, they soon see that the thumb, similar to the tail of a dog, works laterally with greatest ease. Its movements up and down are not nearly as fluent as those of the other fingers. To help the student perfect the executions required in this passage, the camera should be placed to the student's right, facing the front side of the keys from the low position. The lateral movement of the thumb as it passes under the hand can be observed readily from this camera angle. As the thumb begins the arpeggio in bar 79 (Example 10), it must not delay in beginning its lateral move to the right, as it has been observed that the delay is the primary cause for the upward thrust of the upper arm. If the thumb moves quickly to the right, passes under the hand with the upmost lateral stretch, and plays from the high position on its next key, the smooth abduction of the arm to the right will be maintained because balance has not been sacrificed. In rapid passage work equilibrium is essential, as well as the controlled movement of the hands from one position to the next. The last triplet of beat 1 bar 79 must not be released until the next note is down, thereby providing a secure pivot point in the stable key bed. By observing the depressed keys from the front, students can see if they have retained control in the shift of position.

The chromatic run, bars 82-84 (see Example 10) concludes the passage and contains two technical problems that can be studied by observation. While the previous arpeggio figure was a combination of two broken chords in open hand position and a five-finger pattern in closed position, the three-bar descending chromatic scale maintains a closed
hand position. For the precise and quick delivery of this passage, a close relationship between thumb and fingers 2 and 3 must be maintained. Finger 3 which plays all the black keys must be positioned on the front edges of the keys, and the thumb should be placed as close as possible to finger 3. Not only will this compromise the difference in finger length, but it will also allow the hand to be tilted in the direction of the movement so that the back of the hand leads the fingers in the abduction of the arm across the keyboard. Students of this level often get so preoccupied with individual finger movement that they forget this operation is only one part of a larger activity that includes movement of the whole arm. With the camera placed to the right of the student and facing the keys, it is possible to observe forearm movement from the rear. The suggestion can be made that the keys be "dusted" from middle C upward with the tips of the fingers. This action is viewed in the monitor as effortless flow across the keys. The same look must prevail when the fingertips are added to complete the chromatic run and appear as a balanced, fluent movement. The passage begins forte but decreases in volume as it concludes. As less sonority is needed the elbow may be lifted slightly to reduce the weight of the arm on the hand and consequently the amount of sonority.

For many students at this level, this is their first introduction to the traditional fingering for a chromatic scale. The importance of adhering to a set fingering pattern cannot be underestimated. With the camera placed on the left side, at right angles to the keys and facing the treble end, several operations can be studied at once. To help the student get used to the fingering for a chromatic scale, the
first step is to ask them to locate all F's and C's within the passage and expect to see finger 2 play these notes. It is the expectation of the movement or the thought that precedes which most often guarantees the correct response. Untutored playing is most often caused by ignorance or lack of the proper mental conditioning which will govern the movement. By viewing the playing apparatus during the learning process, the student will be conditioned to expectation of the appropriate movements, and the mental organization and perceptions will be strengthened.

From this angle, students may also monitor the position of the tip of finger 3 on the black keys and the free and easy movement of the thumb across the surface of the white keys. As refinement of this passage continues, the tilt of the hand toward the direction of the movement will occur naturally.

The left-hand figuration in bars 79-82 presents no new problem other than the leap of three octaves from beat 1 to beat 3 of bar 79 (see Example 10). As in all figures of this kind, the hand should move directly from the low note to the high chord without the wasted motion of arching over. Many students do not allow their left hands to move with the same precision they have drilled into their right-hand arpeggio. When attention is focused on the more difficult operation of one hand, the other is often left to its own devices. The left hand first beat should be released only when the right hand has reached the 2nd beat. The left hand then moves up in a straight line and positions either thumb or finger 5 on the upper note. The idea here is that if one note within a chord, usually at the outer limits, is placed
appropriately, the others will find their position in relation to that one. It is easier to see one note than three. Once reached, the three-note A minor chord is repeated six times in three pairs from beat 3 of one bar over the beat 1 of the next. As an upbeat requires less weight than the downbeat, the rhythmic pulse of this section must be maintained. Both chords can be executed with a pick-up touch, previously described, only the relative physical activity of the hand will be viewed in the monitor as less for beat 3 than for beat 1, which requires a more vigorous stroke. When the camera is placed at right angles to the student and facing his side from the treble end of the keyboard, this operation may be seen. The student should observe that variations in physical activity make a great difference in the amount of sonority produced.
CHAPTER III

Summary

The video recorder and camera have been used by the writer for the past two years as a teaching aid. The equipment was obtained mainly as a diagnostic tool to help students with technical problems. The premise on which the purchase of the equipment was based was that technical problems have physiological roots and that students would play with more ease and fluency if they had the same opportunity the teacher does to objectively observe their own movements at the keyboard.

Because the writer did not have access to information on the use of video equipment specifically designed for this purpose, teaching techniques and procedures were developed by experimentation. Only methods that worked best, contributed to student progress, and substantiated the basic premise were retained. The monitor was always on during lessons so that even when it was not being used formally the student had the option of glancing up at the screen and making his own private self-evaluations based upon what he observed.

Over the two-year period, student interest in the video equipment as an aid to learning has remained high. Young people today are highly receptive to audio-visual stimulation, and society as a whole is
constantly exposed to the presentation of information through visual means. However, fascination with the equipment would not have been sufficient to sustain interest had not students actually felt they made better progress by using it.

The monitor and recording modes were used primarily to work on a small segment of a composition where actual technical problems occurred or in the teaching of standard technical procedures such as scales and arpeggios. No attempt was made to record an entire composition for study purposes, not only because of the limitation of time within the lesson but also because it was believed that there was too much information for the student to absorb. Student performances, both individual and in groups, were taped before recital appearances, but the main goal here was to help them develop stage presence and poise.

Over the two-year period with the aid of the video equipment, six students prepared "Für Elise" for public performance. In addition, several others studied the piece but did not perform it. The report on the technical study of this composition summarizes the results of working with these students, dealing with the technical problems they encountered, and offering some solutions that proved to be successful. Since teaching with a video recorder as an audio-visual aid is an ongoing, evolving process, this summary of the writer's experiences cannot be considered exhaustive or definitive, but rather a beginning attempt to utilize visual technology. It is hoped that with further exploration in the use of the equipment, more and better techniques will be forthcoming that will enhance learning and benefit student progress.
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Books


Periodicals


Music


Dissertations
