

1979

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The Use of Videe-Tape
in the Acquisition of Volleyball Skills

#564 Instrumentation in Education and Rehabilitation
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May 14, 1979

BACKGROUND

The purpose of this study is to examine the use of video-tape as an instrument for teaching and evaluating specific skills required in sports. To provide an object for the study, the specific skill to be analyzed is spiking a volleyball. The procedure is as follows:

- 1) a skilled actor/athlete performs the activity carefully and correctly;
- 2) the sequence is taped; 3) the edited tape is shown to the children with the instructor standing by to explain the events; 4) after viewing the tape, the children then go onto the court and attempt to perform the skill; 5) this practice session also is taped and then played back; and
- 6) later the instructor will lead the children in analyzing and criticizing their performance.

Video-tape was selected because it has the following advantages:

- 1) it allows skill analysis, capitalizing on the replay and stop action capabilities of the video-tape recorder; 2) the tapes, unlike motion picture film, can be erased and reused; 3) careful analysis of performance through video-tape can be done scientifically if desired; 4) after their attempts, the children can see and analyze their own performance and use the insight gained to improve later attempts; 5) immediate feedback functions as a motivator; and 6) human motor performance is particularly well-suited for television [television] because of its distinct action-oriented nature. In general, physical education has failed to capitalize on the advantages that television and video-tape have to offer. (1,2,4,5,6,7,8,9)

In examining the skills involved in teaching a sport, we find that there are "closed" skills, that depend on analysis of stationary factors in the environment, and "open" skills (more perceptual in nature) that depend on constantly changing factors in the environment. Closed skills, such as serving a tennis ball to a specific location, may be practiced repeatedly, with the goal being conformity and consistency. Open skills, such as spiking in volleyball or returning a tennis serve, must be practiced also, but are different in that they give the learner opportunities to experience many varied and ever-changing situations. The performer must be able to organize his movements based on the prevailing situation and still accomplish the goal. With perceptually changing environments, knowledge of performance is the outcome of the student's movement.^(3,4)

Two factors that distinguish motor skills are: 1) the number of response alternatives; and 2) the time delay between movement selection and movement execution. During active play in a volleyball game, a player's movement may be selected from many different alternate responses, e.g. a spike shot, a dink shot, or a deke. During the ongoing process of a game, a particular shot is selected and executed nearly simultaneously. A game such as volleyball is played in a highly uncertain environment. "The spatial and temporal characteristics of the environment dynamically interact to produce constantly varying environmental conditions to which the player must respond."⁴ The constraints imposed by the environment on a particular movement are: 1) spatial limitations of the playing area, net, and the position of other

players; 2) the time limitations imposed by the movement of players from one position to another on the court. "A movement has to be selected at the moment of execution from many possible choices and in direct response to a set of momentarily conditions."⁴

In summary, the performer must have consistent, efficient patterns of movement, but if he does not execute the appropriate movement at precisely the right instant, he will be ineffective as a player. The player must continually identify relevant cues in the environment and act on them. Videotape can supply information regarding the outcome or consequences of the movement and also knowledge of performance, that is, information about the execution of the movement itself or its form.

PURPOSE

The aim of this study is to teach students a specific skill but, in addition, to act on their environment and conceptualize the outcome of their movement. I would like the students to acquire use of the skill in the all-encompassing meaning of "use", that is, selection just prior to execution, selection based on the ever-changing environment, and execution of the skill. I do not wish to develop in the students a static concept of a skill so that their movements become predictable to the opposing team.

Originally, this study was to deal with two skills, spiking a volleyball and man-to-man defense in basketball. This has been revised to include only volleyball spiking for the following reasons. First of all,

a regulation basketball court is 42' to 50' wide and 74' to 94' long;; the CID court, however is 32'6" wide and 50' long. This difference presented a problem. The smaller court was an advantage to the defense because it did not give the offense sufficient area in which to effectively operate. The court size also affects volleyball play, where the standard court size is 30' wide and 60' long.

A second problem involved placement of the TV camera. In basketball, as the play starts, the camera usually is aimed at the player/players who are bringing the ball to the front court. As they approach the defense, the camera angle is widened. If the player drives toward the basket, the image is changed to a close-up to display any violations or fouls incurred. In basketball, it generally is agreed that the best camera angle is on the mid-court line at the very top of the stands. The same camera angle is also preferred for volleyball.

This high vantage point, however, was not available to me; there are no tall stands in the CID gymnasium. There is a distance of three feet from the out-of-bounds line to the wall of the gymnasium. This proved to be a severe restriction on my attempts to follow the action ~~even~~ with a TV camera, even with a zoom lens: the number of players first was reduced to three on a team, then to one-on-one. This was done because it was very difficult to follow the movement of all the players, the movement of the ^{basket} ball as it was passed from player-to-player, and the trajectory of the players' shots. In addition, a shadow₁ ^(after-image?) appeared on the viewfinder whenever the light sensitive camera was pointed toward the

ceiling lights. I tried a variety of camera angles: court level to the left of the basket, court level at center court, and on a scaffold 6' high positioned at center court. With the court level camera position, the movement of other players often obscured the player with the ball, possible infractions, and the defensive positioning. Also, the shot trajectory was very difficult to follow. The higher position afforded by the scaffold coupled with a reduction in the number of players on the court, made it easier for me to follow the ball in flight ^{toward the basket}, and players did not obscure my view of the ball, but the camera still could not capture all the relevant action (important for conceptualization). If the action took place within a range of 10' from the camera, it was difficult to view it all. This near action occurred quite often, given the small size of the court. As a result, I considered it best to change the plan and examine volleyball skills.

But in volleyball, I encountered many of the same difficulties. The first camera position that was tried was behind the court on a stage raised 3' from the playing surface. At various times, the camera was placed on the scaffold and at stage level. I was able to perceive action clearly only from the near side of the court and much of that was obscured when players turned their backs as they hit the ball. Other players also occasionally blocked my view. I was, however, able to view the service fairly well. The second position was a mid-court ^{view} from the scaffold. As in basketball, I experienced great difficulty in

- 1) following the flight of the ball through the camera viewfinder;
- 2) following the movements of the players; and 3) observing action within

the 10' "blind spot." However, I found that this vantage point afforded a good view of a spike. Therefore, I chose to examine the spike instead of the service, not only because of ease of videotaping, but also because the spike is an example of an "open" skill and thus it requires more than conformity and consistency. The volleyball spike requires the student to make split-second decisions from his view of the action, processing the information and the alternatives available.

BRIEF
A REVIEW OF LITERATURE

In terms of a broad base, video-tape has been used in sports such as basketball, baseball, bowling, golf, football, gymnastics, wrestling, swimming, track and field, and tennis. Del Ray used video-tape specifically in teaching the tennis serve and volley (1976). Video-tape was also used by Del Ray to demonstrate the fencing lunge (1970). The possibilities of video-tape in physical education concerning either team or individual sports remain limited only by one's imagination. The use of video-tape has remained largely untapped due to the cost of the equipment and the amount of time required to tape a specific skill.

TAPING SEQUENCE I

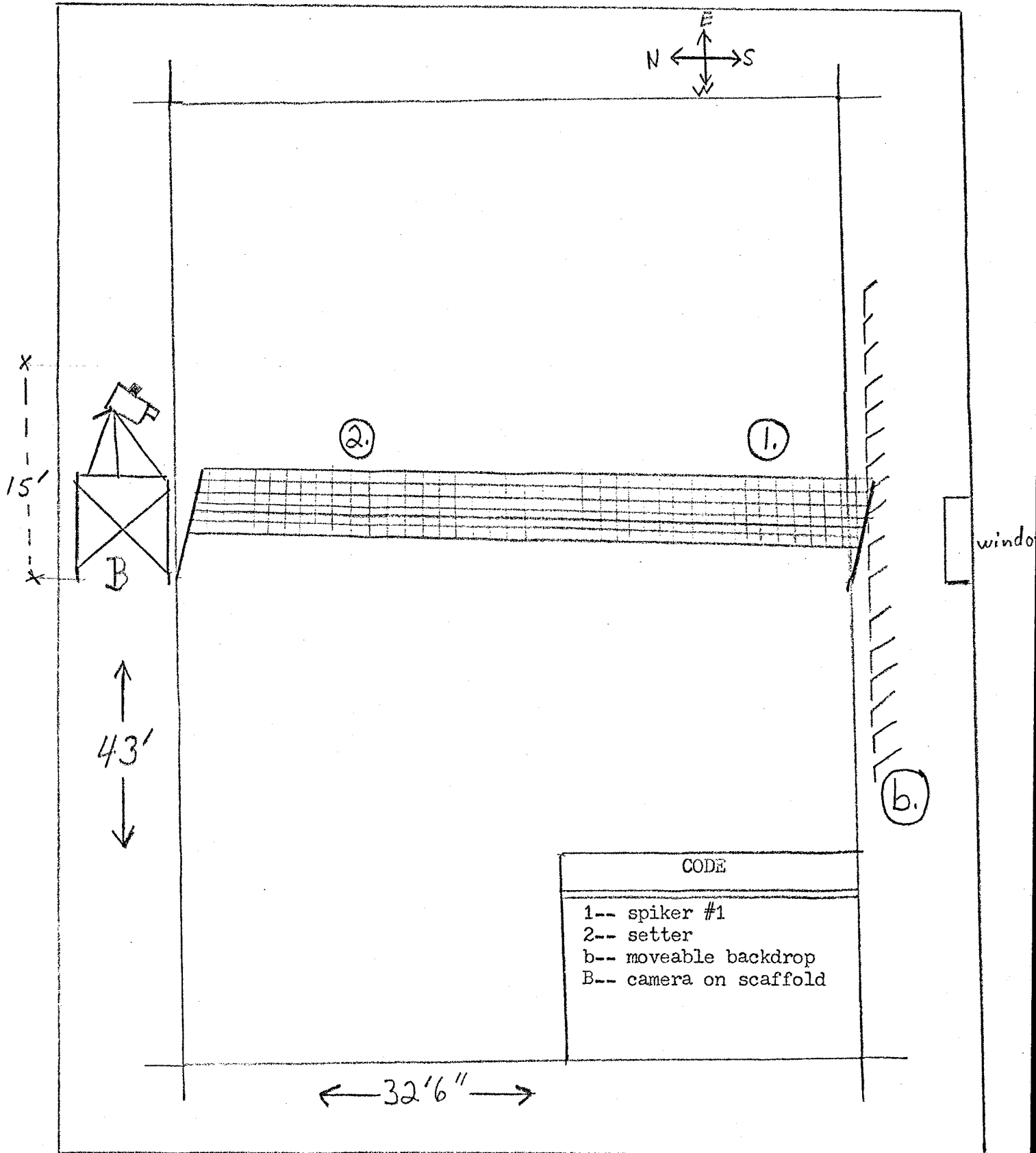


Diagram of Volleyball Court showing camera position and actor/athlete.

Taping Sequence I

Camera position- the camera was located on a heavy-duty tripod clamped to a 6' scaffold at center court.

Players' position- both the 'set-up' person (2) and the spiker(1) were on the same side of the net (east).

Background- a large, moveable, dark green backdrop was moved into position (b) against which both the volleyball and the players' spiking action could be more clearly seen.

Procedure

To record and to provide feedback of the action, a portable SONY V-3600 black and white Video-tape recorder and RCA XL 100 television monitor were set up in the gym, next to the scaffold that supported the camera. In this sequence the "set-up" person passed the ball in a high arc to the spiker who then spiked the ball over the net into the opposite court.

The sequence of recording objects was as follows:

- 1) Demonstration of approximately ten shots
- 2) Isolation of spiking techniques using the close-up lens
 - a. the player's approach to the net
 - b. position of the player's feet as he prepares to jump
 - c. the player's arm swing, ball contact, and follow-through
- 3) Demonstration of common violations or errors
 - a. player's foot over the center line
 - b. touching the net
 - c. use of an incorrect approach to the ball and net
- 4) Reviewing the spiking techniques with approximately five shots

Observations

- 1) Upon reviewing the first tape after recording a sequence of spikes, it was noted that the camera lens adjustment did not allow a clear view of both the spiker and the ball as the 'set-up' person passed it to the spiker. For instance, if the camera was focused on the spiker, the ball did not enter into view until the last instant before contact. This made it difficult for viewers to follow the action. Likewise, if the camera was aimed at the ball as it was passed from the 'set-up' person to the spiker, the spiker did not appear on the screen until the last split-second before contact. In both cases the viewer only had a brief period in which to view the actual spike. The action leading to the spike was incomplete from the observer's point of view.
- 2) In addition, the tape contrast was of poor quality. This indicated a greater need of artificial light, so the window blinds were drawn open to allow the afternoon sunlight to enter. To make himself more visible against the dark background, the spiker changed his shirt from a dark to a light color.
- 3) The viewing angle of the camera was not proper. This was due in large part to the elevated position of the camera. The camera also had been aimed to avoid sunlight filtering in from one window across and to the right of the camera. The angle also made it difficult to follow the movement of the spiker as he approached the net and jumped to spike the ball. Frequently the spiking action was not centered on the screen, and the spiker's hand or ball was off the screen.
- 4) Close-up views of the spiker's approach were ambiguous. During this

TAPING SEQUENCE I

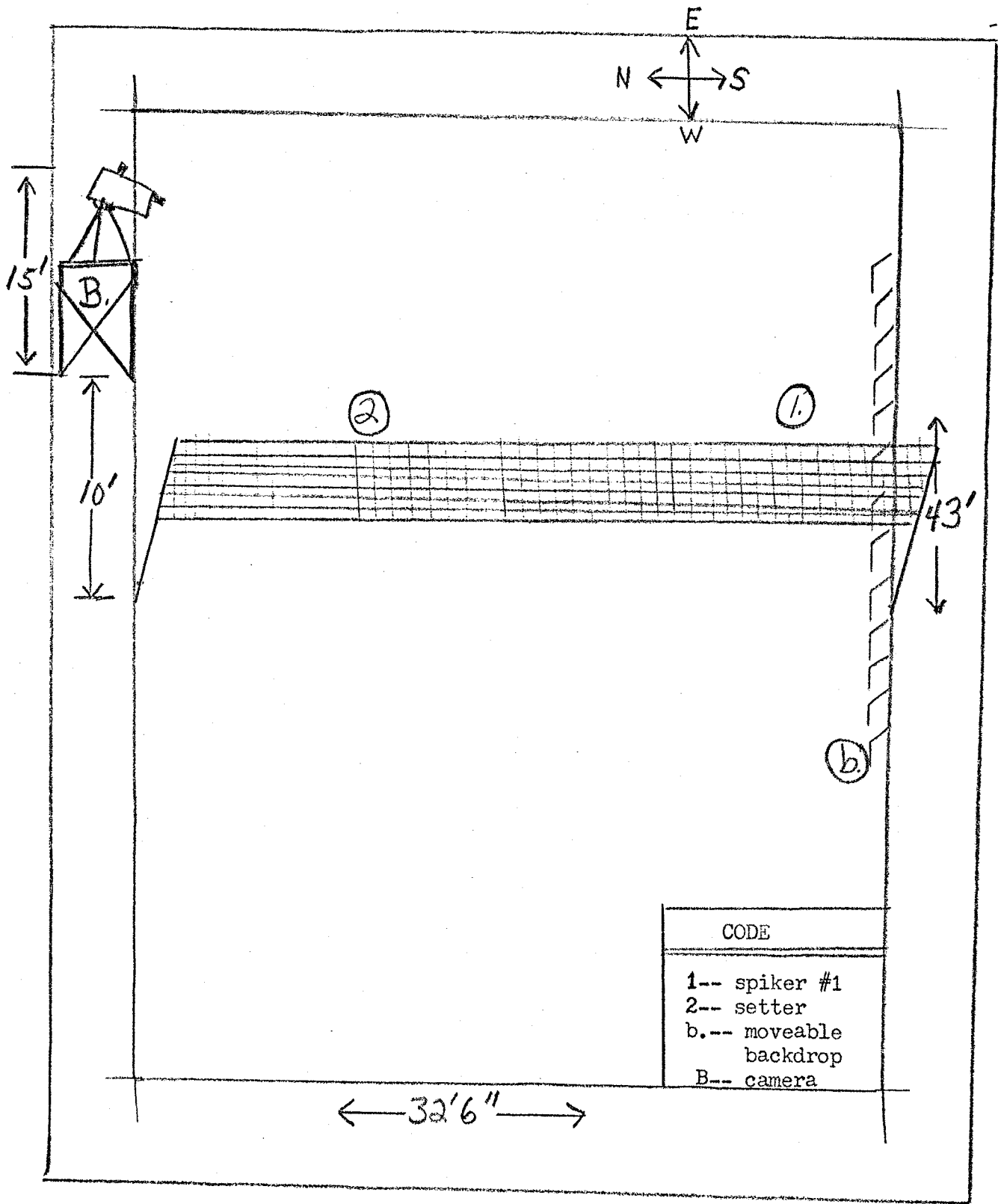


Diagram showing the positioning of camera and actor/player.

procedure, the camera was simply focused on the player's legs or upper torso. Better results would have been achieved if a wide angle view was shown first, after which the camera could be focused on the specific body movement.

Sequence II

In taping sequence II, I tried to incorporate what was learned from the previous experience. The camera was moved to position B in order to avoid the sharp angle of position A and also to avoid the glare from the window. While this new position afforded a better angle of perspective, it did not alleviate the problem of following both the ball and spiker. Also the problem of following the spiker's specific movements remained. Finally, it was concluded that there still was not sufficient ambient lighting to provide proper contrast between the ball, player, and background. (During this sequence, I concentrated solely on the overall view of the spike activity; no specific body movements were taped.)

Sequence III

For sequence III, several major changes were made: 1) the spiker and 'set-up' person were moved to the opposite side (west) of the court. This was done to facilitate a better view of the total action, e.g. not just the spike, but the approach of both the ball and the spiker; 2) the camera was moved. In this new position, the camera did not have to be elevated a great deal, it could now be used in a "set" position vertically; 3) a floodlight on a tall stand was placed on the court to

TAPING SEQUENCE III

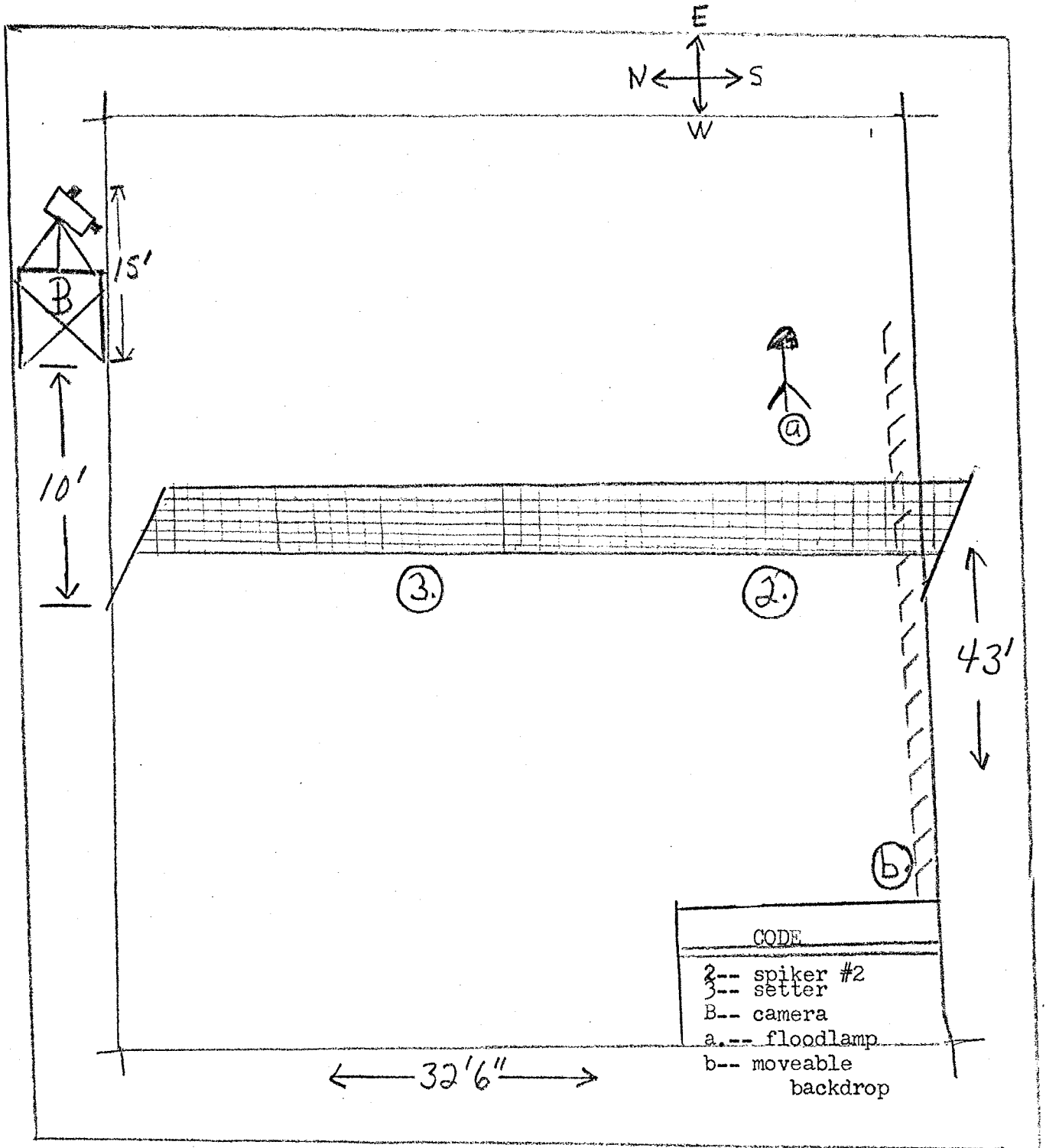


Diagram showing the positioning of the camera and actor/player.

better illuminate the spiker's immediate area; 4) the dark backdrop was moved approximately ten feet in order to accommodate the change of player position; 5) the personnel changed roles. It was determined that a second spiker should perform the action for two reasons: 1) his superior volleyball ability; and 2) he was better known to the children; 6) the players tried a new technique for demonstrating the spike shot. The 'set-up' person passed the ball in a relatively low arc across the net, and the spiker then hit the ball into the opposite court. This procedure was followed to give the cameraman an opportunity to better follow the ball since it was not a high arching pass. Also by keeping the camera low, the camera could more easily follow the spiker's approach to the net.

All of these changes were beneficial. The result was a clear, concise image of the spike sequence. From this viewing angle, one could see the vigorous arm extension and the snapping of the wrist ~~[of the wrist]~~ by the spiker as he made contact with the ball. More practice is needed in working on the low 'set-up' and spike before a final video-tape can be attempted. This new technique serves as a compromise, because there is no wide-angle camera lens available at this time. A wide-angle lens might make the above-mentioned modification unnecessary.

Session IV.

In this taping session, the equipment was set up in the same position as in Session III. However, there were two notable equipment additions: two 600 watt flood lamps on small stands, which were placed in positions b and c. Their additional lighting provided the extra

TAPING SEQUENCE IV.

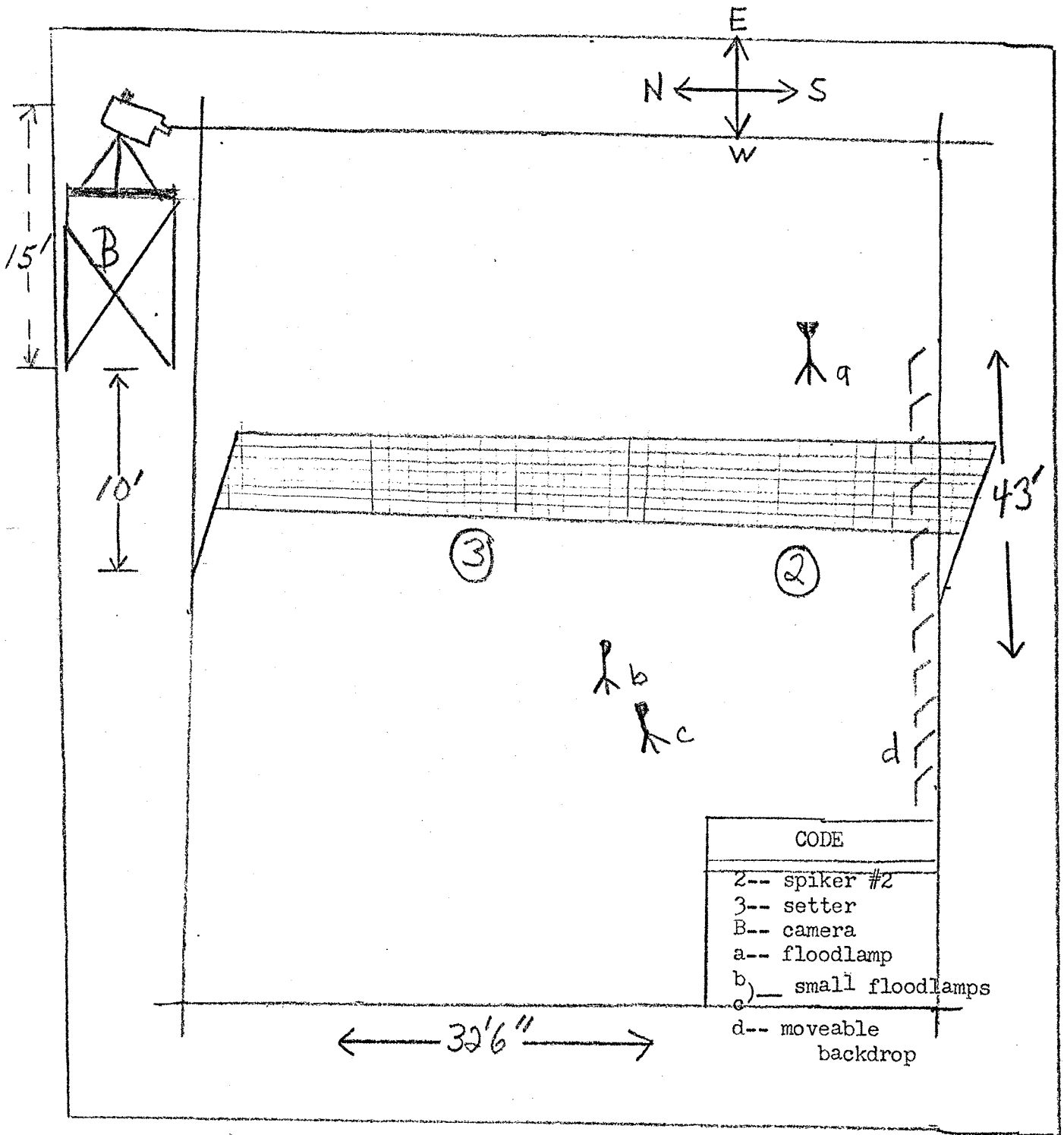


Diagram of CID volleyball court showing positions of camera, lights, and actor/player.

illumination needed to avoid shadows and "dark spots."

At the beginning of the taping session, the cameraman followed the flight of the ball from the 'set-up' person to the spiker. Both high and low sets were tried, however, examination of the replay revealed that this method was unsatisfactory. Due to the size of the CID gym, the camera could not be adequately positioned to capture the entire sequence without a good deal of distracting movement.

An alternative procedure was then followed. The camera was aimed at the spiker's upper torso as he approached the net and ball. As the spiker jumped, the camera remained aimed at the upper torso. Using this technique the camera need be moved only slightly. Despite the fact that the pass is only visible for a fraction of a second before contact is made, the spiker's arm extension and snapping of the wrist can be clearly seen. Approximately ten spikes of high quality were recorded in this manner.

Steps 2,3, and 4 (see page 7) followed in succession; however, there were three points of departure from the printed procedures. First, the spiking technique was not recorded ^{with} using the close-up lens. Use of this lens required a good deal of camera work that resulted in off-centered or missed sequences, therefore, I opted for the wide angle lens. Second, it was noted that when the spiker faced the camera during his approach to the net and ball, more detailed information in terms of proper technique were visible. Third, the spiker tended to exaggerate the violations and common errors, and these were edited from the tape.

Taping Sequence V (a)

Prior to this session, the tape made in Sequence IV was electronically edited using another video-tape recorder. The edited tape, which was approximately five minutes in length, was shown to a group of five children ranging in age from 13 to 15 years old. The instructor was present and explained to the children what they should look for, i.e. the vigorous snapping of the spiker's wrist and violations. (Unfortunately the quality of the video-tape was poor due to the corresponding poor quality of the VTR that was used. This poor quality was made worse as it was edited by another model VTR. The synchronization impulses were of differing qualities and the result was a distorted picture.)

Immediately following the tape, the children were positioned on the volleyball court and practiced spiking the ball. (The net was lowered to a height where the average child in the class could touch the top with outstretched fingers.) Following the practice, each child was taped as he executed approximately five successive spikes. When the instructor and/or the cameraman noticed aberrations in the child's performance, the camera was aimed specifically on the error in approach, form, timing, or shot mechanics.

V (b)

The first taping showed that the children knew and could perform the necessary movements involved in a spike. In the next procedure, the children were required to perform the spike with two blockers attempting to thwart the shot. The instructor gave the blockers signals concerning

TAPING SEQUENCE V(a)

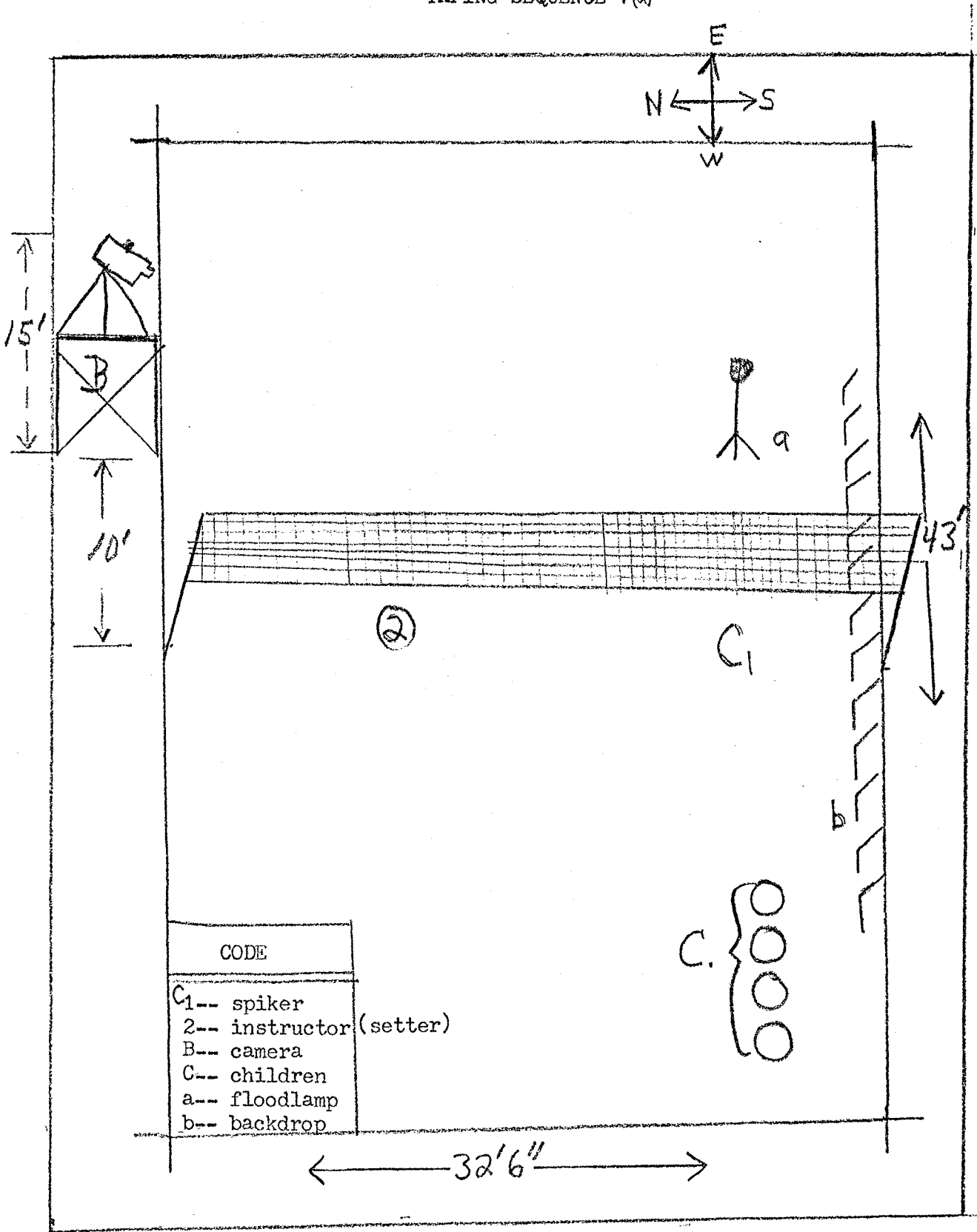


Diagram showing the positions of camera, lights, and children.

TAPING SEQUENCE V (b) .

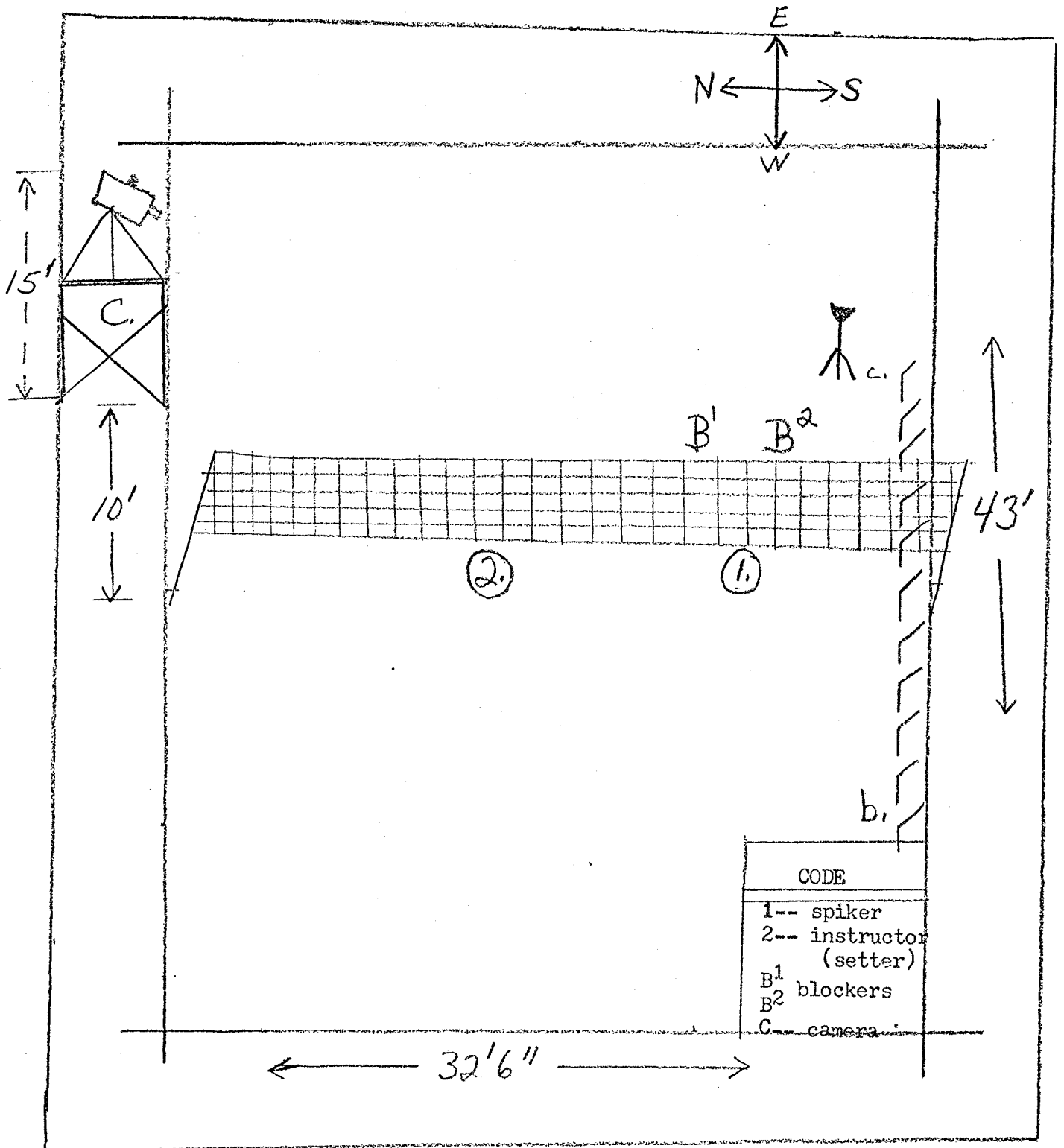


Diagram showing the positioning of blockers, spiker, and camera.

whether or not to challenge, i.e. block, the shot. If the two blockers attempted to block the shot, the spiker would either; 1) spike the ball away from the blockers, or 2) lightly tap the ball over the net out of the player's reach---a "dink" shot." If the blockers did not attempt to deflect the ball but held their positions, the spiker slammed the ball away from them. Each child had the opportunity to spike and to block the ball.

V (c)

After the above procedure was completed, the video-tape was replayed for the children. Using the knowledge that they had gained from the instructional tape, the children pointed out each other's mistakes and good form. If the instructor spotted an example of either a particularly good or poor spike, it was replayed in slow motion. This particular VTR was not equipped with a slow motion control, so the instructor had to put the control switch in the PAUSE position and then manually turned the tape reels to simulate slow motion. This technique was excellent for showing the subtleties of the spike, (wrist snapping, position of the hand on the ball, timing of the jump to hit the ball at the apex of the jump.)

The children enjoyed the opportunity to see themselves on video-tape and to see themselves performing a skill in sports. They proved to be adept in identifying correct and incorrect form. The children also showed a fairly good understanding of the environment of spiking. The children showed that they recognized the technique they should use (depending on whether or not the blockers attempted to stop the spike). However, a lack

of practice and experience put limitations on their skills such as the ability to execute a "dink shot."

CONCLUSION

In conclusion, video-tape is a viable means of teaching and/or analyzing skills in a sport such as volleyball. It has the distinct advantage of allowing the children to view themselves performing an activity such as the spike in volleyball. This use of videotape provides immediate visual feedback the child can use to adjust or to improve his own individual technique. The presence of the video-tape equipment also serves as a motivating factor to the children, so they will give their best effort. Finally, video-tape is flexible. It can be erased and reused, and it can be used in examining either "closed" or "open" skills in sport.

ACKNOWLEDGEMENTS

The author expresses his thanks to Jean-Pierre Gagne and Tom Frank for their assistance and suggestions in the taping process, Bill Miksicek for repairing the Ampex camera, Charlie Donnelly for technical assistance, and Ken Nicolai for technical assistance and editing the final version of the tape. A special thank you is expressed to Dr. Norman P. Erber for his supervision and invaluable comments and suggestions.

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