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THE DEVELOPMENT OF A PROGRESSION OF SYNCHRONIZED
SWIMMING SKILLS TO ACCOMPANY THE AMERICAN RED
CROSS BEGINNER SWIMMING PROGRESSION

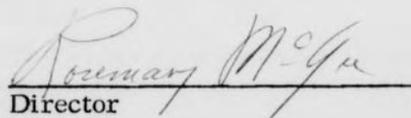
by

Marilyn Eastridge

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the Faculty of the Graduate School at
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It was the purpose of this study to develop a program of synchronized swimming skills appropriate for girls of approximately eight to ten years of age who were beginning swimmers. This program was designed to accompany the American Red Cross Beginner progression of skills. There were four beginner classes composed of twelve girls each. Every class met twice a week for a total of fourteen half hour periods, and all were taught by the investigator.

The Red Cross Beginner swimming progression was taught with the addition of six selected synchronized swimming skills: sculling, head first, hands at the sides; the tub; the log roll; the flying porpoise; the front tuck somersault; and the back tuck somersault. The girls were divided into high and low skill groups after the fourth lesson to facilitate instruction. The progression for these separate skill groups was in accordance with their respective abilities.

Thirty-two girls were rated during the fourteenth class session by five judges. Eight skills were included in the rating: front crawl in shallow water; back kick glide in shallow water; front crawl in deep water; combined back stroke (sculling and flutter kick) in deep water; sculling head first, hands at the sides; tub; log roll; and back tuck somersault. Not all girls performed all skills because of the variance of individual abilities within the groups. All girls were compared on the basis of the eight skills, however, since these skills were the ultimate objective of all participants in this beginner swimming course.

The data were analyzed in regard to the total group, the high skill group and the low skill group. Means and standard deviations of each group were computed for the performance of all skills, general swimming skills and synchronized swimming skills. The performance of the high and low skill groups was compared. Stunts were analyzed for appropriateness.

1. There is a significant positive relationship between general swimming ability and ability to perform synchronized swimming skills.
2. Girls of average beginning swimming ability or above are capable of adequately performing synchronized swimming skills at the time that they are taught beginning swimming skills.
3. Girls of poor ability in beginning swimming skills, especially those who are fear cases, cannot perform synchronized swimming skills with any degree of success. In fact their fear and tenseness may be increased by trying to perform them.
4. Sculling head first with the hands at the sides, the log roll and the back tuck somersault were all performed with approximately equal success by the swimmer of average ability or slightly below. The tub was performed with much less ease by these swimmers. The first three stunts would be appropriate for beginning swimmers of average ability or above.

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CHAPTER I

INTRODUCTION

"The term 'synchronized swimming' was first introduced to a large group of people at the 1934 Chicago World's Fair. Norman Ross coined the term to announce a group of rhythmic swimmers performing in the lagoon theatre." (36:26) However rhythmic swimming was given its first impetus by Annette Kellerman as early as 1910. (36) Since that time interest has grown: high schools, colleges, universities and recreational groups have formed synchronized swimming clubs; competitive meets and festivals are held; symposiums and workshops have grown in number. The Amateur Athletic Union; the Federation Internationale de Natation Athlete; and the Division of Girls' and Women's Sports of the American Association of Health, Physical Education and Recreation have included rules and regulations for synchronized swimming within their organizations. More recently the International Academy of Aquatic Art, devoted solely to the creative aspect of swimming, has been established. "During the period of 1946-1953 . . . synchronized swimming was serving the dual purposes of a creative activity and a competitive activity," (36:69) and it has continued to do so.

Among the personalities associated with the early development of synchronized swimming was Gertrude Titus who incorporated stunts in the swimming program and used these activities as an integrated part of a

professional course offered to future teachers at the Boston School of Physical Education Camp in June, 1915. (36:12)

The teaching of methods in synchronized swimming seems to have followed no particular pattern.

In 1947-48 a unit in synchronized swimming was included in a Methods of Teaching Swimming class at Washington University in St. Louis. A class in Methods of Teaching Synchronized Swimming was initiated by Evelyn Dillon in 1948-49 at Wellesley College. (36:57)

Betty Spears has included synchronized swimming skills in Water Safety Instructor's Courses given at Wellesley and Mt. Holyoke since 1959. (35) The Red Cross has included synchronized swimming as one part of its Aquatic Schools, but there is no general plan for the inclusion of synchronized swimming methods in any instructor's course outlined by the Red Cross, Young Men's Christian Association or Boy Scouts. In a representative sample of colleges and universities in the United States, Stoerker (36) found that only 7.74% offered professional training in synchronized swimming. Vickers states:

Synchronized swimming has actually long been included in programs of swimming instruction, as a motivator. Teachers use stroking to music as a means of developing rhythm; simple somersaults and rolls help students become accustomed to the water. Some teachers have been hesitant, however, to offer synchronized swimming, as such, because of a lack of knowledge of beginning techniques. (31:32)

It is probable that because swimming instructors are not required to have a knowledge of synchronized swimming methods, most children, when receiving basic swimming instruction, are not introduced to synchronized swimming skills. The history of synchronized swimming has shown it to be an activity steadily growing in appeal and scope. It appears to have value for

swimmers of all levels of ability and of various ages. In the belief that young children are physically capable of performing these types of skills and that, if performed, they will lead to increased interest and ability in swimming, the investigator has undertaken this study.

CHAPTER II

STATEMENT OF THE PROBLEM

It was the purpose of this study to develop a program of synchronized swimming skills appropriate for girls of approximately eight to ten years of age who were beginning swimmers. This program was designed to accompany the American Red Cross Beginner progression of skills.

There were four beginner classes composed of twelve girls each. Every class met for a total of fourteen half hour periods, twice a week, on Tuesday and Saturday.

For the purposes of this study the following definitions were accepted:

Synchronized Swimming Skills: Selected stunts or parts of stunts and selected elements, other than stunts, which could be applied to or used in a total routine. The form for beginners of this age shall be recognizable but elementary.

Beginning Swimmers: Those girls who would be classified by ability as students in a Red Cross Beginner course. This may include both non-swimmers and girls with some very basic swimming skill.

The progress of the swimmers was analyzed and described in relation to high and low skill groups as well as the group as a whole.

CHAPTER III

REVIEW OF LITERATURE

This problem suggested three major areas of literature for review. The physical and motor development of this age child as it pertained to her ability to perform selected swimming skills was of primary importance. Secondly, a review of suggestions for, and actual progressions in, beginning swimming skills had to be consulted to determine the best one for use with this particular problem. Finally the literature dealing with synchronized swimming was reviewed. Particular attention was given to the values of synchronized swimming, its feasibility for beginners and actual beginning skills in synchronized swimming.

PHYSICAL AND MOTOR DEVELOPMENT

There seems to be relatively little difference in the three ages of eight, nine and ten in respect to their characteristics of growth and development. Almy (1) states that, where growth is concerned, there are no rapid changes until well toward the end of the six to twelve year period, and that acceleration of growth in girls usually occurs after the tenth birthday. She elaborates by saying that from nine to twelve most children have increased manual dexterity, increased strength and increased resistance to fatigue. Breckenridge and Vincent (6) provide more specific facts. In the six to twelve

year span, control of arm, shoulder and wrist muscles improves rapidly. An analysis of the beginning synchronized swimming skills reveals most to be dependent, at least in part, on arm and shoulder strength due to the sculling movements they employ. Therefore it is important that this type of movement be appropriate to these age levels in terms of physical capacity. Andrews says,

Most of the games, dances and other activities in the physical education curriculum build leg strength; stunts that build upper trunk, shoulder and arm strength have special value for children in the third and fourth grades. (4:38)

The general conclusion that strength, power, endurance and coordination improve in the eight, nine and ten year old is supported by Andrews (4), Halsey and Porter (15), and Larson and Hill (17). However, in listing characteristics of the six to eight year olds Halsey and Porter state that, "Since children differ so much in rate of growth and in growth potential . . . all children cannot be expected . . . to reach the same level of ability." (15:22) Gesell and Ilg also point out that, "Individual differences, apparent at nine, become still more manifest at ten." (11:214) These authors go on to list specific motor characteristics of the three ages:

Eight Year Old

- more receptive to learning new techniques
- more increase in speed and smoothness in fine motor performance
- more symmetry
- ready to tackle anything, in fact likes hard things
- movement more rhythmical and graceful

Nine Year Old

- more skillful in motor performance and likes to display skill
- timing under better control
- more persistence
- more purposefulness
- two hands can be used independently
- more restricted movements

Ten Year Old

- more individual differences
- continued physical growth

Creativeness is also developing during this period as indicated by Fraser (9). She lists this trait as one of the characteristics of the eight, nine and ten year old, and creative activities as one of the satisfying experiences for this age group. Halsey and Porter in a discussion of appropriate physical education activity for the six to eight year old say, "Stunts are enjoyed. . . . Since most youngsters become much larger and stronger during the primary grades, they can develop many new skills and are forever trying to see what they can do." (15:22) Of the nine to eleven year olds they say, "Free movement and movement problems provide opportunities for developing the really fine locomotor skills and the grace and expressiveness of which children are capable at this age." (15:32) Andrews says this age is ". . . Inventing new games, dances, stunts and many more activities . . . experimenting with new ways to perform various motor skills in an effort to determine how to become more profi-

cient." (3:39) Breckenridge and Vincent state, "At very early levels children tend to stunt in any field of motor activity as soon as they master a skill." (6:312)

BEGINNING SWIMMING

A progression of beginning swimming skills had to be chosen in light of certain limitations. The progression had to be appropriate for young girls of beginning swimming ability, and it needed to be one which is used often with girls. If a progression were chosen for use which was seldom used with girls, the development of a program of synchronized swimming skills to accompany it would be of little value. This is not to discount the fact that boys can and do perform synchronized swimming skills, but generally it is the girls who perform these skills.

Several established progressions were consulted along with progressions outlined in swimming or sports methods books to determine the content of the beginner swimming program to be used. Vannier and Foster (22) suggest that the Red Cross has graded sheets which are available to Water Safety Instructors. They then suggest a test for beginners which is slightly different from that of the Red Cross which includes sculling and the elementary back stroke and excludes the human stroke and the combined tests in deep water. Ryan (19), in his progressive list of skills for the non-swimmer, indicates the front crawl is the first stroke to be taught. This is followed by sculling and then the back crawl. Mann (20), in an article concerning a school swimming program for the elementary age child, outlines a much shorter progression which proceeds from

breath holding to the elementary front crawl done for a short distance. He includes no skills which require swimming on the back. Armbruster, Allen and Billingsley (5) list the usual beginning skills of water adjustment and prone and back floating. They also include sculling, an elementary crawl stroke, elementary back stroke and body spin which is done in a tucked, face-down position with propulsion provided by the arms and hands. Cureton (8) in analyzing seven methods of teaching swimming, found that six of the seven taught the front crawl stroke using arms, legs and rhythmic breathing. Only three of the seven used the back float. None used a surface dive. He then devised his own method which included the front crawl, back glide, two continuous surface dives utilizing the bottom of the pool for push-off, and deep water tests using a combination of skills. Since Cureton was instrumental in the development of the National Young Men's Christian Association Aquatic Program, that skill progression bears a great deal of resemblance to his original one. The YMCA progression (24) is one of the more widely used and warrants a listing of each skill included in the Minnow Club, or beginner program:

- Open eyes under water
- Front glide - pulled by partner
- Prone flutter kick holding side for 15 seconds
- Prone glide for 5 seconds
- Kick glide across pool
- Kneeling dive
- Turtle float
- Back glide for 3 seconds
- Front crawl arm stroke while standing
- 'Paddle' 15 feet
- Kick and breathe regularly 10 times
- Bobbing in chest depth
- Recover object in chest depth

Plunge dive and glide 15 feet
 Two continuous surface dives using pool bottom for push-off
 Underwater swim for 10 feet
 Swim across pool any way, getting two breaths
 Rhythmic, rotary breathing 10 times
 Jump in deep water, swim 20 feet
 Swim 20 feet in the prone position, turn and swim 20 feet on the back
 Jump in deep water, swim 25 feet and return

The YMCA used YMCA Aquatic Leader-Examiners and YMCA certified Aquatic Instructors. These people must have taken YMCA courses in Lifesaving and Water Safety, assisted a YMCA Aquatic Director and attended a YMCA Aquatic Institute or School. YMCA classes may be held for non-YMCA groups, but must still be supervised by the YMCA.

The American Red Cross Beginner progression (2) includes the following skills and combinations of skills:

Breath holding for 10 seconds
 Rhythmic breathing 10 times while standing
 Prone float
 Prone glide for 2 body lengths
 Back float for 10 seconds
 Back glide for 1 body length
 Kick glide on the front for 3 to 5 body lengths
 Arm stroke for the human stroke
 Finning
 Combined stroke on the front for 20 to 25 yards (It is permissible to introduce a modified version of the crawl stroke with arms recovered above the surface after teaching the human stroke.)
 Combined stroke on the back for 10 yards
 Change of direction - right angle and full turns while swimming
 Leveling off in neck-deep water
 Jump into waist deep water, finishing with a glide
 Plain front header in deep water
 Jump in deep water, swim 15 yards and return
 Dive in deep water, swim 15 yards, turn, return half the distance, turn on back, rest for 15 seconds, turn back to front and swim the remainder of the 15 yards

Though the Red Cross does not include synchronized swimming skills in its progression, it suggests the following activities in its lesson plan summary: "Tapering off period, by means of free swimming, stunts, games of low organization and informal competition." (2:14) They explain further by this statement:

While a 'stint' is a task, a 'stunt' is a feat of skill usually performed to attract attention. After swimming students have done their stint of practicing new skills, they are capable of performing many stunts and enjoy doing them for their friends, relatives and bystanders. This desire to interest, to entertain, to please and sometimes to startle is a worthwhile thing to encourage, under control. It is a great help to teachers anxious to accelerate the process of learning new feats of watermanship, starting with the simplest and continuing right on up to those requiring the highest skills. (2:153)

The skills listed at the beginning level include only floating and speed skills, however, and nothing that approximates synchronized swimming skills. In a section in the Red Cross Manual headed "Stunts for a Water Spell Hour" (2:156) certain stunts are listed but not designated for any particular age level. In the "Water Spell Hour" the instructor calls out the name of a particular stunt or skill and each class member, in turn, attempts to perform it. Those not able to do the stunt or skill called must drop out of the game. The "spell down" continues until only one student (or more at the instructor's discretion) is left. The suggested stunts are:

- Surface dive
- Log roll
- Marching on water
- Foot-first scull, hands at the sides
- Foot-first scull, hands over the head
- Flying porpoise

Water wheel
Front and back somersaults

The only progression found to include designated synchronized skills is that of the Young Women's Christian Association. (25) Its beginner units are divided into two series: Novice and Beginner. These almost approximate the Red Cross Beginner progression, with the addition of sculling, treading water and the elementary back stroke. The basic synchronized swimming skills for the units are as follows:

Novice

- tub, elementary form
- dive under partner's legs from a standing position

Beginner

- log roll, elementary form
- foot-first sculling on the back, hands at sides
- somersault, elementary form

These progressions are designed for use by the YWCA, but the YWCA has no lifesaving or instructor's program of their own and specifies that teachers must have the Red Cross Water Safety Instructor's Certificate.

The program which seemed most appropriate for use with young girls who are beginning swimmers was the Red Cross Beginner progression. The Red Cross program is the most extensively used and the majority of instructors are trained by the Red Cross. Although the YMCA progression is extensively used, this is done primarily in the facilities of YMCAs. It is true that many YMCAs have activities for girls and women but their program is primarily oriented toward men and boys. The YWCA, of course, designs courses for girls and women, but their YWCA Swimming Program is relatively new and is not used

by all Associations. Most of those not using it use the Red Cross progressions.

SYNCHRONIZED SWIMMING

No adverse opinions about the value of synchronized swimming or the feasibility of it for beginners were found in the literature. There is the possibility that those who consider it of no value or impossible for the beginning swimmer have simply omitted any mention of it from their books and articles.

Any supplement to a program should add something of value in order to merit its addition. Gabrielson, et al., state,

Synchronized swimming is an enjoyable and valuable activity for all swimmers. The aquatics instructor will find swimmers' endurance, body control and skills improved through participation in synchronized swimming . . . and most important of all, synchronized swimming is esthetically satisfying and it is fun! As a regular class activity . . . synchronized swimming can be a motivating factor in the entire aquatics program. (10:83)

Goss also considers the play element a factor: "Many people work very hard trying to master the strokes in swimming. By introducing stunts a certain tension is relieved and unconsciously the swimmer relaxes the body. Stunts bring in an element of play." (13:34) Cureton says, "The stunt idea is most popular and the most natural way to have fun in the water. The more stunts one knows, the more fun he has in the water." (7:9)

The creative value is cited by Gundling: "The creative aspect of synchronized swimming alone makes it a most welcome addition to the list of other creative activities." (14:7) von Wenck states that: "It offers interesting coordinations for beginners who have learned only the most elementary skills or it presents problems in creative ability and coordinations of sufficient

difficulty to interest the most advanced students." (32:318) In her book, Beginning Synchronized Swimming, Betty Spears sums up the values of synchronized swimming as follows: "Endurance; skill; body control; ease in the water; knowledge of rhythm and design; motivation for practice; fun and enjoyment; group activity in competition and performance." (20:2)

Several swimming authorities agree generally about the feasibility of synchronized swimming activities for the beginning swimmer. Spears states that,

Boys and girls, men and women, beginning swimmers as well as advanced swimmers will enjoy and benefit from synchronized swimming. While both age and ability are limiting factors, with simple routines beginning swimmers of any age may achieve creative experience thru this activity. . . . Eight and nine year old children can be surprisingly well-skilled in stunts. While perhaps not able to compose complete routines, under good leadership they can do effective group work. (20:1)

Gabrielson, et al., agree that youngsters can learn stunts and that, "Through play that helps the pupil become acclimated to water, confidence, breath control, body position, balance, coordination and relaxation can be taught." (10:52)

During a play period in swimming, children turn somersaults, stand on their hands and roll over and over. They like the abandon which is possible in the water. When these children are shown the correct form of stunts with proper breathing, they are thrilled and eager to learn more. (23:3)

That opinion was written by Yates and Anderson. In addition, they state that,

It [synchronized swimming] can be started in classes at any level of ability as soon as the swimmers achieve fair mastery of a skill. Even in classes whose major purpose is to teach only the standard skills, synchronized swimming can be a useful and enjoyable teaching device. (23:1)

Few authors list synchronized swimming skills specifically for the beginning swimmer. Most of the literature in this area is devoted to synchronized

swimming for the individual who is competent in basic swimming skills. It has been assumed that beginners might be able to perform some of the basic synchronized swimming skills often reserved for the advanced swimmer. For this reason, the beginning synchronized swimming skills were reviewed.

Beulah Gundling, in her book Exploring Aquatic Art, states that:

While a few of the skills used in Aquatic Art (and even a very simple composition based on these skills) may be learned and performed by the beginning swimmer, utilization of these and the more advanced skills in an artistic manner requires, among other things, a much greater proficiency in basic swimming skills than that possessed by the beginner. (14:6)

She suggests that these simple skills include the basic movements of sculling and turning. These movements when applied to simple skills encompass rolling stunts as a log roll or corkscrew; revolving stunts as a tub; twists, which at the beginner level would be with the head up; and somersaults, which in their simplest form mean forward and back somersaults in a tuck position. All of these, with the exception of the log roll and corkscrew involve sculling.

Gundling elaborates on sculling by saying, ". . . It plays so prominent and important a part in the efficient execution of many figures, it must be mastered by every potential aquatic artist as early as possible." (14:103) Its importance is also stressed by Goss: "Sculling is one of the most important skills, and really the first skill a person attempting to learn stunts must be able to do." (12:iii)

Others who list sculling as basic to the performance of stunts are MacKellar and Maeys (28), Yates (33), Spears (20), and Vanderpool (30). George Rachham, in the book Swimming as Taught by Experts, (16:108) lists five principles of movement in synchronized swimming all of which involve the use of the hands

and arms in some type of sculling or other propulsive movements:

1. If moving the body from one place to another, a propulsive movement by the hands pushing the water in the opposite direction is necessary.
2. If rotating the body, a propulsive movement by the hands is necessary.
3. If rotating the body in a clockwise direction, the arms rotate about the shoulders in the opposite direction.
4. When doing a ballet leg, a flat scull is necessary to push the body up in the water.
5. When any part of the body is out of the water the speed of the scull must be increased so that more pressure is exerted downward.

MacKellar and Maeys (28) list other fundamentals basic to skill execution besides sculling. These involve the learning of the following positions: layout - front and back; vertical - head up or down; pike; tuck. They say further that,

A combination of stationary sculling, tuck position, and head first and feet first sculling is a good starting point from which a number of stunts can be developed with the addition of several modifications. (28:53)

Spears (20) lists the basic positions as tuck, pike and layout. Vanderpool (30) lists the layout and vertical positions.

Actual stunts for beginning swimmers have been suggested by Bullock. She states:

Most swimming instructors find that the beginning swimmer who has conquered an initial hesitancy about being in water, has learned the simpler elements of breath control, and moves about with some ease is ready for stunts. . . . To the alert teacher, these skills are activities which contribute measurably to a student's watermanship. Consequently they should be taught as soon as possible. (26:27)

She considers the following techniques basic to effective learning of all other stunts: Handstand - to be taught after breath holding, rhythmic breathing and the turtle float; front tuck somersault - to be taught after the above plus sculling;

back tuck somersault - to be taught after all the above.

Beginning or basic stunts in synchronized swimming have been enumerated in several sources. Rackham (16) lists a porpoise, forward pike somersault, back pike somersault, tub, tuck somersaults, a half roll from back layout to canoe position, seal and split porpoise as basic stunts. Yates (33) lists a tub, log roll, marlin, shark, porpoise, handstand and single ballet leg. Cureton classifies stunts as "easy", "moderately difficult" and "relatively hard" in his book, Fun in the Water. (7) In the easy category are: vertical sculling, rotary sculling, sit spin, flutter back scull, horizontal walking on water and gliding underwater. In the moderately difficult group are: circle sculling on the side, foot-first scull, canoe, flying porpoise and a log roll. Goss (13) actually lists nothing at the beginner level. The low intermediate level, as far as regular swimming skills are concerned, goes through the side stroke, front crawl, and basic diving. In this unit she includes the following synchronized swimming skills: spinning top - sitting position with knees apart and ankles crossed; log roll; vertical rotation - head up; forward and back tuck somersaults; and handstand. Yates and Anderson (23) list beginning skills and their point difficulties. These difficulties have been established by the Amateur Athletic Union primarily for use in rating competitive synchronized swimming. They are useful in non-competitive synchronized swimming in that they denote the difficulty of a particular stunt according to the movements and positions involved in it. The lowest point difficulty of any stunt is 1.1 and the highest 2.1. Difficulties increase by tenths of points.

Churn (surface tuck in the vertical and turning with arms sweeps) - 1.2
Log roll - 1.1
Tub - 1.1
Foot first porpoise - 1.1
Shark - 1.2
Front tuck somersault - 1.1
Back tuck somersault - 1.1
Porpoise - 1.2
Handstand - no point difficulty

The review of literature served to point up the lack of material concerning synchronized swimming for beginning swimmers. It is probable that the regular practice of including these skills in beginning progressions will not occur until they are included in an established progression, and until synchronized swimming methods are taught as a part of an established instructor's course. The values of synchronized swimming cited by several authors would seem to indicate the worth of these additions. It is hoped this study will provide some insight into the content of these additions.

CHAPTER IV

PROCEDURE

THE SETTING

The pool at the University of North Carolina at Greensboro was under construction during this period of time, so community resources were investigated. The Health, Physical Education and Recreation Director of the Young Women's Christian Association was consulted and arrangements were made for the use of the Young Women's Christian Association pool. It was made available at no cost. A seven week period was agreed upon for the completion of the instruction. During this seven weeks there would be fourteen half-hour classes, meeting twice a week on Tuesday and Saturday. Because of the size of the pool (50' x 20'), and the resulting amount of shallow water area (about 20' x 20') it was necessary to limit the size of each class to ten.

THE STUDENTS

Since this was, in essence, a Young Women's Christian Association sponsored program, the Health, Physical Education and Recreation Director made the initial arrangements for securing potential class members. Her first contact was with the Principal of an elementary school in the city. This particular school was selected for a specific reason. The Young Women's Christian Association agreed to offer these classes at no cost to the participants. It

seemed logical to use as class members a group of girls who normally could not economically afford to participate in this sort of activity. This school drew its students almost entirely from an area classified as lower or lower-middle economically. The principal agreed that a selected number of his pupils could participate in the swimming classes. Arrangements were subsequently made for the investigator and the Health, Physical Education and Recreation Director to visit the school two weeks prior to the time the classes were to begin. One week prior to this meeting, information blanks (A copy may be found in the Appendix.) were taken to the school and distributed to the girls in the third and fourth grades. These blanks were to be taken home to the parents to inform them of the general nature of the plans for the swimming classes, and of the coming meeting at the school to which they were invited.

The investigator and the Health, Physical Education and Recreation Director met with the third and fourth grade girls, and as many of their parents as were able to attend, after school and in separate groups according to grade. At this time, both the Health, Physical Education and Recreation Director and the investigator spoke to the assembled groups to further explain this project and to answer questions. The following points were stressed: (1) The classes were for beginning swimmers. This was explained by some elaboration on the Red Cross Beginner course content, stressing that those who had completed or were able to perform these skills were not beginning swimmers. (2) Only a selected number of girls would finally be chosen because of limited time and space. A second group of more detailed information blanks was given to the

girls. (A copy may be found in the Appendix.) This information concerned transportation, which was provided by the Young Women's Christian Association; details about times and days of classes; and class permission slips. The girls were instructed to have these slips signed and returned by the next day if they had their parents' permission to participate in the swimming classes.

The permission slips were picked up the following day by the investigator and were divided according to grade. There were forty-three third graders and thirty-five fourth graders. Of these, five third graders, as indicated by notations on their blanks, were above beginning swimmer level. The same was true for four fourth graders. This study was concerned with only beginning swimmers, therefore these nine girls were eliminated immediately. A drawing was made by the investigator of forty-eight names from the remaining sixty-nine eligible. Twenty-four girls were selected by each grade group. The investigator was not acquainted with the girls nor did she have any previous knowledge of their swimming ability; the selection was randomly made.

Twelve girls were selected for each class on the assumption that some would not participate regularly and would possibly drop out altogether. The classes were established according to grade; there were two classes of third graders and two classes of fourth graders. Lists were compiled of the students selected and given to the school secretary. These girls were examined by the school physician and were notified in this way of their selection. It was necessary to revise these first lists slightly due to the fact that two girls were not given medical clearance, one was moving out of town and three were not in

school and could not be examined by the physician. Additional girls, all of whom had medical clearance, were selected at random from those remaining after the initial drawing.

The only criteria for the placement of girls in classes was their grade in school. On the first day of class, before the lesson began, a simple face float test was given to determine how many of the girls were able to do this skill satisfactorily. Instruction was then given, and the techniques of face floating were included. The girls who were able to do the face float were noted again at the end of the period. Class members were then rearranged within the two third grade groups, and within the two fourth grade groups in an attempt to have all the third grade floaters and non-floaters in separate classes and all the fourth grade floaters and non-floaters in separate classes. This was done to facilitate instruction both from the instructor's and pupils' points of view. It was desirable to keep the same number in each class due to the small size of the pool. It was impossible, because of this, to completely separate the two skill groups in each instance but it was done as nearly as was possible.

It became apparent after the fourth lesson that some girls were progressing rapidly, and some were not. When girls of good and poor skill were in the same class it prevented each from getting the attention due her. Therefore, in order to facilitate instruction, the class members were rearranged slightly in good and poor third grade groups and good and poor fourth grade groups. All girls were school classmates and acquainted with one another, so changing classes did not seem to have an adverse emotional or mental effect caused by

leaving "best friends." The classes remained arranged in this manner until the end of the instructional period.

THE INSTRUCTION

Questionnaire

A letter of explanation and a questionnaire were sent to a selected group of swimming specialists. (The list of respondents and a copy of the questionnaire may be found in the Appendix.) This group of ten was selected from among those who hold positions of leadership in the aquatic field. They were asked for general comments concerning the proposed study and to check the listed skills which they thought were appropriate for this age group and this swimming level. They were also asked to add any skills which they thought would be appropriate. There was one hundred per cent return of the questionnaire, some with extensive comments.

Although all ten specialists returned the questionnaire, one did not check the skill list. He felt that the opinion of the Red Cross, which he represented, would be reflected in the reply of another Red Cross official who was also contacted. His opinion of the proposed research was favorable. Comments of all respondents were of interest and deemed important insofar as they related to the general feasibility of this study. The comments were generally favorable. A sampling of them is presented below:

I definitely feel that many basic synchronized swimming skills can be fitted into a Red Cross Beginner and Advance Beginner program since it can certainly do much to add interest, motivation and variation to youngsters 8 - 10 years old.

They should be introduced as playskills.

. . . we need to give youngsters a chance to build on their own skills without always giving them all the answers. A simple introduction to a stunt without all the details can provide a challenge.

Biggest problem . . . is that I have a time problem to accomplish what we do in basic ARC with 30 min. classes anyway.

I would strongly recommend including basic synchronized swimming skills in the Beginner Swimming progression for children 8 - 10 years old. They will help stimulate interest, and increase watermanship, confidence and skill in the water.

The more experience a youngster has in the water, the greater her confidence in handling her body in the water However, the average beginner is still tense while in the water To introduce basic synchronized swimming skills too early (before reasonable relaxation, and swimming confidence and proficiency) may only serve to add a tension factor to these skills which in the long run, may be a detriment to skilled synchronized swimming.

Of course it is feasible.

I have found the most difficult goal to accomplish is that of using the creativity which every individual has anything which could be done at an early age would be advantageous later.

The general course content was somewhat determined because the Red Cross Beginner progression was adopted. It was necessary, however, to decide which synchronized swimming skills would be taught. Ultimately the skills were selected by the investigator but she was guided by the results of the questionnaire. (Table I) The total number checking skills was nine. An attempt was made to select skills chosen by the greatest number of respondents.

TABLE I
 SKILLS CONSIDERED FOR INCLUSION IN PROGRESSION
 ACCORDING TO QUESTIONNAIRE RESULTS
 (9 Respondents)

Skills	Number of Respondents Selecting Skills
*Tub	8
*Sculling head first, hands at sides	7
*Back tuck somersault	7
Handstand	7
Use of music in teaching and practicing skills	7
*Front tuck somersault	6
Marching, head first scull	6
*Flying porpoise	5
*Log roll	5
Canoe scull modified - face in water	5
Spinning top - similar to tub, but with knees apart and ankles crossed	5
Surface dive - tuck position	5
Sculling foot first, hands at sides	4
Water walking, foot first scull	4
Lobster scull modified - face in water	3
Oyster	3
Use of surface patterns in practice of skills	3

TABLE I (continued)

Skills	Number of Respondents Selecting Skills
Development of a simple routine using a combination of skills	3
Marlin	2
Porpoise	1
Those skills suggested in addition to the ones listed on the questionnaire	
Waterwheel	2
Star float	1
Flat scull - layout	1
Shark	1

*Those selected for use in this study.

However, three skills which scored highly were not selected for the following reasons: (1) Marching - The sculling it required would be introduced relatively late in the progression, and there was not enough time available to include both marching and the tub after sculling. The tub was thought to be the more important of the two. (2) Handstand - It was considered too difficult in relation to the other skills and the time available. (3) Music - This was not used because the facilities and physical surroundings were not conducive to it in this particular instance.

Experience with all the basic positions - layout, tuck and pike - was desirable in order to provide a general body of knowledge from which to progress. This was one of the determinants in selecting skills. For this reason the flying porpoise was selected even though it was chosen by only five respondents. It was considered the easiest stunt using a pike position. The log roll was selected because it seemed to combine well with the turning-over skills in the Beginner progression; it gave the swimmer some beginning experience with a twist type of movement. It was thought to be, in its beginning form, simpler than some of the other skills selected by more respondents.

Progression

Lesson plans were identical for all four class groups during the first four lessons. Beginning with the fifth lesson two class groups were classified as having higher skills and were progressing more rapidly, while the other two groups were classified as having lower skill and were progressing slowly.

Lesson plans were made accordingly. The teaching of skills followed a progression the investigator had found relatively successful in several years' previous teaching of beginning swimmers. The synchronized swimming skills were introduced one at a time at separate lessons for the most part. It was desired that these skills correspond to the skills of general swimming where possible. For example, the front tuck somersault was taught after the tuck float so that the body position would be somewhat familiar; the log roll, which involves both a front and back layout position, was introduced after the prone float (which uses the front layout) and the back float (which uses the back layout); sculling could not be taught until the swimmers were relatively at ease on their backs; and the tub, because it utilizes sculling and the back layout position had to follow both of those skills. No synchronized swimming skills were introduced until the fourth lesson. The swimmers needed to develop some familiarity with the water and some knowledge of their bodies' reaction in and to the water before attempting these skills. (Complete lesson plans may be found in the Appendix.)

EVALUATION

Ratings of general swimming and synchronized swimming skills were made following thirteen class periods. The rating scale was developed for this particular study and was patterned after a scale used in an advanced swimming study done by Lintner. (34) (A copy of the scale used in this study may be found in the Appendix.) The number of skills to be rated was determined in light of

two considerations: (1) The time limit for rating each class was the length of the regular class period of one-half hour. (2) A representative number and variety of skills taught had to be included. Skills done on both the front and back were included and certain skills done in both shallow and deep water were included since one of the goals in the Red Cross Beginner progression is deep water swimming. The swimming skills rated were the front crawl and the back kick glide performed in shallow water and the front crawl and combined stroke on the back (sculling and flutter kick) performed in deep water.

Elimination of two of the six synchronized swimming skills was necessary. Since the front and back tuck somersaults are similar, the front somersault was the one arbitrarily omitted. Little teaching time had been spent on the flying porpoise since the girls had encountered much difficulty with it when first tried, so it was eliminated. The remaining synchronized skills to be rated were sculling head first, tub, log roll and back tuck somersault.

There were eight skills to be rated; four classified as general swimming skills, and four as synchronized swimming skills. The range of the rating scale was from zero to five. This meant that the highest number of points possible from one judge was forty, and with five judges the highest possible total rating was two hundred points. The highest possible total for all judges for the four synchronized swimming skills was one hundred points and the same was true for the four general swimming skills.

Three faculty members and two graduate students in the Department of Health, Physical Education and Recreation at the University of North Carolina at

Greensboro were selected to judge because of their previous experience in teaching swimming and synchronized swimming. They were given the descriptive sheets for the rating scale approximately six days before a training session was to be held with them. They were asked to read this descriptive material and bring any questions to the training session. During that session the investigator briefly reviewed the descriptive material, answered questions concerning it, and gave each judge the actual rating forms. The mechanics of the ratings were explained. When the judges were given the descriptive material, they were asked to observe one of the three remaining instructional periods before the rating session. Each judge was asked to observe all four classes during the period so that she might become familiar with the skill level and range of performance.

The rating session was held during the last, or fourteenth, class period. Each class was rated separately. Every skill was performed by each girl in turn rather than each girl performing every skill. Time was allowed for a few performances to be repeated if any of the judges thought it necessary. One performance was all that was necessary for the most part. All judges scored each girl on each skill. The rating sheets were signed by each judge and given to the investigator at the end of the period.

The classes had been divided after the fourth lesson into high and low skill groups. These groups, two classes in each, progressed at different rates of speed; therefore, it was possible to introduce more skills to the more highly skilled group. It became apparent that the classes progressing at the slower

rate of speed were not able to learn the same type or amount of synchronized swimming skills. It seemed important, in determining a progression of synchronized swimming skills for beginners, to point out this variation in skill among those classified as beginners. For this reason, evaluation was made and interpreted in terms of the higher skilled group and the lower skilled group as well as the total group.

STATISTICAL TECHNIQUES

Several statistical techniques were used in evaluating the appropriateness of the selected synchronized swimming skills to these particular beginning swimmers. The four classes were evaluated in total; also, of those four, two classes were evaluated as a high skill group; and two as a low skill group.

Mean and Standard Deviation

The means and standard deviations of the following groups were computed in order to show the central tendency and dispersion of their respective scores in the various skills:

- 1.) The total group; the high skilled group; and the low skilled group in all skills.
- 2.) The total group; the high skilled group; and the low skilled group in general swimming skills.
- 3.) The total group; the high skilled group; and the low skilled group in synchronized swimming skills.

The means of the performances of the four synchronized swimming skills were also computed. Means and standard deviations were computed using the formulas suggested by Ray. (18:69 and 71)

Correlation

The following product moment correlations were computed using the formula suggested by Ray: (18:142)

- 1.) Intercorrelations between the ratings of the five judges on the final test for eight different skills.
- 2.) Correlations between the scores obtained on the general swimming skills and those obtained on the synchronized swimming skills for the total group; the high skilled group; and the low skilled group.

Significance of Difference

The "t" test of the significance of difference between independent means suggested by VanDalen (21:318) was used to determine significance of the difference between the means in each of the following combinations:

- 1.) The high group and the low group in total skills.
- 2.) The high group and the low group in general swimming skills.
- 3.) The high group and the low group in synchronized swimming skills.

CHAPTER V

ANALYSIS OF DATA

The purpose of this study was to develop a progression of synchronized swimming skills to accompany the American Red Cross Beginner progression. Because this progression is often taught to children of approximately eight to ten years old, an attempt was made to select synchronized swimming skills appropriate to the beginning swimmer of this age. The selected synchronized swimming skills were included in the regular Red Cross Beginner course and the total progression was taught to four classes of beginning swimmers. Each class contained twelve girls; two classes were composed of third graders and two of fourth graders. Each class met twice a week for seven weeks. Each class period was one-half hour long. Thirty-two of the forty-eight girls originally enrolled were given final ratings. Class enrollment dropped because of illness, change of residence or lack of interest. The data collected during the rating session will be analyzed and interpreted in this chapter.

INTERCORRELATIONS OF JUDGES' SCORES

Four general swimming skills were rated: the front crawl and kick glide on the back in shallow water; and the front crawl and combined backstroke (using sculling and the flutter kick) in deep water. Four synchronized swimming

skills were rated: sculling; the tub; the log roll; and the back tuck somersault. All thirty-two girls did not perform all eight skills because of their individual skill levels. The number of girls rated on each skill is included in Table II. The scores of the judges were correlated in order to determine the consistency of their ratings. The formula for correlation suggested by Ray (18:142) was used to correlate the scores of the five judges with one another. These correlation coefficients are presented in Table II. The following things are evident in relation to these coefficients:

1. All coefficients are positive.
2. The majority are quite high. The lowest coefficients are for the log roll. This is the one synchronized swimming skill attempted by every girl regardless of her general swimming ability. Therefore, performance between individuals was quite erratic due to the skill variance. There is the possibility that the rating instructions given the judges in regard to this particular skill were not clearly defined. There were errors made by the low skill group particularly which were not included in the rating descriptions. This caused some inconsistency of interpretation by the judges. The erratic performance and the inadequate rating instructions may have been the cause of the variation between judges' ratings.
3. The higher correlations of judges' ratings are found for the skills performed by the more highly skilled girls; i.e., the tub, somersault, sculling and the deep water strokes. It would appear that there is more agreement between judges when rating the higher skilled performer than when rating the lower

TABLE II

INTERCORRELATIONS OF THE RATINGS OF THE JUDGES

Front Crawl
(N-32)

Judges	2	.77			
	3	.72	.57		
	4	.81	.72	.74	
	5	.88	.84	.68	.80
		1	2	3	4
		Judges			

Back Kick Glide
(N-32)

Judges	2	.68			
	3	.95	.57		
	4	.95	.85	.90	
	5	.85	.72	.85	.88
		1	2	3	4
		Judges			

Sculling
(N-17)

Judges	2	.83			
	3	.97	.90		
	4	.91	.78	.95	
	5	.86	.87	.97	.86
		1	2	3	4
		Judges			

Tub
(N-15)

Judges	2	.79			
	3	.92	.89		
	4	.97	.81	.85	
	5	.85	.79	.90	.95
		1	2	3	4
		Judges			

Log Roll
(N-32)

Judges	2	.68			
	3	.61	.63		
	4	.67	.80	.75	
	5	.50	.65	.60	.60
		1	2	3	4
		Judges			

Back Tuck Somersault
(N-18)

Judges	2	.97			
	3	.97	.96		
	4	.98	.97	.95	
	5	.96	.96	.96	.94
		1	2	3	4
		Judges			

Front Crawl (deep water)
(N-10)

Judges	2	.88			
	3	.98	.80		
	4	.98	.99	.98	
	5	.98	.95	.97	.93
		1	2	3	4
		Judges			

Combined Back (deep water)
(N-5)

Judges	2	.88			
	3	.92	.94		
	4	.90	.96	.97	
	5	.82	.81	.77	.74
		1	2	3	4
		Judges			

skilled performer.

4. All coefficients are acceptable; the ones for the log roll are acceptable with reservation.

The correlation coefficients, with their frequencies and cumulative percentages, are presented in Table III. It can be seen that this group of eighty coefficients is quite high over all. Sixty per cent are above .85, 85% above .70, and only 9% of the coefficients fall below .70. On the basis of these high coefficients, all judges and all stunts were retained and used in arriving at composite scores for all skills, synchronized swimming skills and general swimming skills.

CENTRAL TENDENCY AND DISPERSION OF SCORES

The means and standard deviations of scores were computed for the total group, the high skill group, and the low skill group. Not all girls were rated on all skills but means were computed on the basis of a rating for all eight skills. Since the ultimate objective of this course was to learn all eight skills, all girls were compared on that same basis. It should be noted that the final scores of a few of the girls who were put into the high skill group after the fourth lesson did not seem to justify their being considered higher skilled swimmers. Some overlapping of scores between groups occurred as may be noted in Table IV. Scores of some of the high skill group swimmers were lower, in some instances, than some of those of the low skill group swimmers. The possibility of treating these low-scorers as members of the low skill group

TABLE III
FREQUENCY AND CUMULATIVE PERCENTAGES OF
INTERCORRELATIONS OF THE RATINGS BY THE JUDGES

Correlation Intervals	Correlation Frequency	Cumulative Percentages
.95 - .99	25	31%
.90 - .94	10	44%
.85 - .89	13	60%
.80 - .84	9	71%
.75 - .79	6	79%
.70 - .74	5	85%
.65 - .69	5	91%
.60 - .64	4	96%
.55 - .59	2	98%
.50 - .54	1	100%

TABLE IV

MEANS, STANDARD DEVIATIONS AND SIGNIFICANCE OF
DIFFERENCE BETWEEN MEANS OF THE TOTAL, HIGH AND LOW
GROUPS ON ALL SKILL GROUPINGS

<u>All Skills**</u>	N	Range	SD	Mean	"t"
Total Group	32	0 - 142	40.6	51.7	
High Group	17	29 - 142	31.9	82.1	7.24*
Low Group	15	0 - 36	12.0	17.5	

Synchronized Swim Skills***

Total Group	32	0 - 68	21.8	23.3	
High Group	17	17 - 68	16.2	40.3	8.24*
Low Group	15	0 - 13	4.3	4.1	

General Swim Skills****

Total Group	32	0 - 74	20.7	28.4	
High Group	17	12 - 74	19.0	41.7	5.19*
Low Group	15	0 - 29	9.1	13.3	

*A "t" must be 3.627 or larger to be significant
at the .01 level.

**Number of total points possible - 200

***Number of synchronized swim points possible - 100

****Number of general swim points possible - 100

for purposes of analysis was considered. However, by virtue of their being included in the high skill group since the fifth lesson, they had been introduced to and had attempted more skills than the other group. Because their experience was not comparable, it was impossible to include them in the low skill group even though their scores would seem to indicate they were low skilled swimmers. Having to treat them as part of the high skill group had the effect of lowering the means and raising the standard deviations of that group.

The following interpretations can be made in regard to the means and standard deviations presented in Table IV:

1. The total possible number of points on all skills was two hundred. This means that this total group of swimmers, with a mean of 51.7 is below the general average in swimming skill. The high skill group in this study was closer to the general average but still did not meet it. It should be noted however, that when considering individuals, seven of the seventeen higher skilled girls did score above 100.
2. The means of the groups in synchronized and in general swimming skills did not meet the general average of 50 of a possible 100 points. Again it should be noted that four of the girls in the high skill group scored above the average mean of 50 in synchronized swimming skills, and five of them did the same in general swimming skills.
3. The group designated as the high skill group in this study appears really not to be of high skill when considered in relation to the hypothetical high skill group which would have means of over 100 for total skills, or over 50 for

general and synchronized swimming skills. The high skill group in this study has scores which indicate it is an average to below average skill group.

4. The dispersion of scores around the means was more extreme for the high skill group in all three categories of comparison. This higher standard deviation can be accounted for by the inclusion of those girls thought to be of higher skill who did not produce accordingly.

SIGNIFICANCE OF DIFFERENCE

The "t" test for the significance of the difference between uncorrelated means, as suggested by VanDalen (21:318), was used. The difference between the high and low groups on all skills, synchronized swimming skills and general swimming skills was found. A null hypothesis was constructed in regard to each of these differences. All differences were significant at better than the .01 level of confidence, as is illustrated in Table IV, and the null hypothesis was rejected in each case. The difference between the two groups was not a chance occurrence but a real difference. Although there is a smaller difference between the groups in general swimming skill, it appears that this difference makes the difference in the group's ability to perform synchronized swimming skills. That is, the significantly superior ability of the high skill group in general swimming skills enabled them to produce a significantly superior performance in synchronized swimming skills also. This can be seen as correlations are considered.

CORRELATION OF GENERAL AND SYNCHRONIZED SWIMMING ABILITY

The total scores for general and for synchronized swimming ability for the total, high and low groups were correlated. The values of these coefficients were used to compute "t" values using the formula suggested by Ray. (18:280) Then VanDalen's table of "t" values was consulted and all coefficients were found to be significant at better than the .01 level of confidence. (21:387) It is evident, in light of this significance, that synchronized swimming ability had a substantial relationship to the general swimming ability of these girls. These correlations are presented in Table V.

TABLE V
CORRELATION OF SYNCHRONIZED SWIMMING ABILITY
WITH GENERAL SWIMMING ABILITY

Groups	N	r
Total Group	32	.83*
High Group	17	.67*
Low Group	15	.59*

*All correlations are significant at better than the .01 level.

APPROPRIATENESS OF SKILLS

The means of the scores of each synchronized swimming skill were computed and are presented in Table VI. They were computed on the basis of a zero to five point individual rating by adding and averaging the scores of the five judges. These were completed only for the high skill group because they

performed all the synchronized swimming skills. The low skill group was taught only the log roll and back tuck somersault. The log roll was the only one in which they had a minimal degree of success. Their general swimming ability did not justify including more synchronized swimming skills in their progression. The means indicate that sculling, the log roll, the back tuck somersault and the tub are appropriate in that order.

TABLE VI
MEANS OF PERFORMANCE ON SYNCHRONIZED SWIMMING
SKILLS FOR THE HIGH SKILLED GROUP
(N - 17)

Skills	Mean
Sculling	2.39
Log Roll	2.34
Back Tuck Somersault	2.24
Tub	1.33

When the scores of the low skill group swimmers on the log roll are considered the mean is lowered considerably and it would appear to be the least appropriate stunt. This was the only stunt they were capable of performing. To include their scores on this one stunt would make a comparison between the four stunts impossible. For this reason their scores were excluded in this particular computation.

The means of performance of the high skill group are below the average which would be 2.5 on a 5-point scale. However, it should be pointed out that

all the means were below the average in terms of possible points on all skills, synchronized swimming skills and general swimming skills. Therefore, the means obtained for each skill are commensurate with the skill of these particular girls.

It is the investigator's opinion that the majority of girls in the high skill group did enjoy the synchronized swimming skills. They provided variety and challenge. The girls seemed to have more understanding of what their bodies could do and how the water reacted to them after performing these skills. It is likely that this early experience could enhance beginning synchronized swimming performance at a later time and age. It is difficult to say, however, whether or not the synchronized swimming skills enhance beginning swimming performance. There was a significant correlation between the two, but the design of this study does not allow a statement to that effect. It is the investigator's subjective opinion that more time would be necessary for this type of relationship to occur, but that it would occur.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Synchronized swimming skills are suggested by the American Red Cross but are not included in any of their progressions. It was the investigator's opinion that these skills, if included, would increase motivation, enjoyment of the water and improve general swimming ability. Over and above this, proceeding from a basis such as these skills would provide might lead to a stronger and more successful synchronized swimming program for advanced and older groups. The American Red Cross Beginner progression was selected because it is the most extensively used with girls.

Questionnaires were sent to ten swimming experts in order to obtain their opinions concerning the study and their recommendations concerning the skills they thought appropriate for this age group. Skills were selected in light of questionnaire results, but the ultimate decision was the investigator's.

The teaching was done in the Young Women's Christian Association pool. Forty-eight girls were randomly selected for classes from seventy-eight third and fourth graders returning signed permission blanks. All girls were students in one of the city schools. There were four classes containing twelve girls each. Two classes were made up of third graders and two of fourth graders. They met twice a week on Tuesday and Saturday for seven weeks.

There were thirteen half-hour instructional periods with the fourteenth being the rating session. The investigator taught all classes.

The Red Cross Beginner swimming progression was taught with the addition of six selected synchronized swimming skills: sculling head first, hands at the sides; the tub; the log roll; the flying porpoise; the front tuck somersault; and the back tuck somersault. The girls were divided into high and low skill groups after the fourth lesson in order to facilitate instruction. Data were analyzed according to this division. Each skill group was made up of two classes. The high group was taught all six synchronized swimming skills along with the general swimming skills. The progression of the low skill group in general swimming skills was slow and did not justify the presentation of all six synchronized swimming skills.

Thirty-two girls were rated during the fourteenth class session by five judges. A rating of zero to five, according to a predetermined rating scale, was given each girl on each skill she performed. This scale was constructed by the investigator for the purposes of this study. Eight skills were included in the rating: front crawl in shallow water; back kick glide in shallow water; front crawl in deep water; combined back stroke (sculling and flutter kick) in deep water; sculling head first, hands at the sides; tub; log roll; and back tuck somersault. Not all girls performed all skills. All girls were compared on the basis of the eight skills, however, since these skills were the ultimate objective of all participants in this beginner swimming course. Judges' rating scores were intercorrelated prior to the analysis of the data in order to determine their

consistency. All coefficients were acceptable, with 80% higher than .70.

The data were analyzed in regard to the total group, the high skill group and the low skill group. Means and standard deviations of each group were computed for the performance of all skills, general swimming skills and synchronized swimming skills. The performance of the high and low skill groups was compared. Stunts were analyzed for appropriateness. On the basis of these results the following conclusions can be drawn:

1. There is a great deal of variance in skill within a beginner swimming class.
2. There is a significant positive relationship between general swimming ability and ability to perform synchronized swimming skills.
3. Those girls of average beginning swimming ability or above are capable of adequately performing synchronized swimming skills at the time that they are taught beginning swimming skills.
4. Those girls of poor ability in beginning swimming skills, especially those who are fear cases, cannot perform synchronized swimming skills with any degree of success. In fact their fear and tenseness may be increased by trying to perform them.
5. Sculling head first with the hands at the sides, the log roll and the back tuck somersault were all performed with approximately equal success by the swimmer of average ability or slightly below. The tub was performed with much less ease by these swimmers. All of the first three stunts would be appropriate for beginning swimmers of average ability or above.

SUGGESTIONS FOR FURTHER STUDY

1. The same sort of work should be done for the other Red Cross progressions: Advanced Beginner, Intermediate and Swimmer. As practice and progression in synchronized swimming skills continued, its impact for the beginner level probably would be even greater.
2. A study should be structured to compare those beginning swimmers taught synchronized swimming skills and those who were not in order to determine the effectiveness of their inclusion in the Red Cross Beginner progression.
3. A longer period of time should be used for a study of the effectiveness of the inclusion of synchronized swimming skills at all swimming skill levels - Beginner, Advanced Beginner, Intermediate and Swimmer - up to that of beginning synchronized swimming itself.

SUMMARY

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January 2, 1945

Dear Parent,

The Birmingham YWCA is offering free swimming lessons to girls who are under 16 to the end of the year in which they turn 16.

Classes will meet for sixteen times. They will meet after school on Tuesdays and Thursdays at noon in the YWCA pool.

Transportation to and from the class will be provided.

There is absolutely no charge for these classes. If a girl does not have a swimsuit or cap, she may borrow one from the YWCA each class.

The teacher's name is Marilyn Hambridge. She is doing graduate work in Physical Education at UNCG.

There will be a meeting of all the _____ grade girls at _____ on the _____ day, _____, January 12. The swimming teacher and Mrs. _____ from the YWCA will wish to meet to explain the program and to answer any questions.

APPENDIX

Parents, we want you to come to this meeting if at all possible, and to give your child permission to stay a few minutes after school that day. At that time we will give you a further sheet telling your child where to go and what.

Sincerely,

Miss. Don Churchill
Director, HPER Department

(Miss) Marilyn Hambridge
Swim Teacher

January 8, 1965

Dear Parent,

The Greensboro YWCA is offering free beginning swimming lessons to girls who are non-swimmers in the 3rd and 4th grades in Calvin Wiley School, starting January 26.

Classes will meet for fourteen times. They will meet after school on Tuesdays and Saturdays at noon in the YWCA pool.

Transportation to and from the class will be provided.

There is absolutely no charge for these classes. If a girl does not have a swim suit or cap, she may borrow one from the YWCA each class.

The teacher's name is Marilyn Eastridge. She is doing graduate work in Physical Education at UNC-G.

There will be a meeting of all the _____ grade girls at _____ in the Calvin Wiley auditorium, Wednesday, January 13. The swimming teacher and Mrs. Chatfield from the YWCA will both be there to explain this program further and to answer any questions.

Parents, we want you to come to this meeting if at all possible, and to give your child permission to stay a few minutes after school that day. At that time we will give you a further sheet telling your child where to go and when.

Sincerely,

Mrs. Don Chatfield
Director, HPER Department

(Miss) Marilyn Eastridge
Swim Teacher

C/E/p

January 13, 1965

Dear Parent:

YWCA free Swimming Classes start Tuesday, January 26.

On) 3rd grade girls will be picked up at Wiley School at 2:30 p.m.
Tuesdays) 4th grade girls will be picked up at Wiley School at 3:15 p.m.

All girls will be returned to their homes as soon as the swim class is over.

On) Both 3rd and 4th grade girls will be picked up at the same time by
Saturdays) bus. The bus will stop at Wiley School at 11:45 a.m., go im-
mediately to the Smith Homes Project office, then directly to the
YWCA.

All girls will be returned to these two points shortly after 2:00 o'clock on
Saturday.

Please return the blank below, properly filled out, to Mr. Richie's office by
Thursday, January 14.

Sincerely,

Mrs. Don Chatfield
Director, HPER Department

(Miss) Marilyn Eastridge
Swim Teacher

C: E: p

Cut Here

I give my child permission to take swimming at the Greensboro YWCA starting
January 26.

Child's Name _____ Age _____ Grade _____

Home Address _____ Telephone _____

Signature of Parent or Guardian _____

QUESTIONNAIRE RESPONDENTS

1. Gladys Brown
Consultant, Health, Physical Education and Recreation, Community Division
National Young Women's Christian Association
New York, New York
2. Anne Ross Fairbanks
Author and present Health, Physical Education and Recreation Director of
the Young Women's Christian Association of Troy
Troy, New York
3. Berthaida Fairbanks
Chairman of the Division of Girls' and Women's Sports Aquatics Committee
from 1963 to 1965
University of Rochester
Rochester, New York
4. Prudence Fleming
Representative of the Division of Girls' and Women's Sports to the Council
for National Cooperation in Aquatics
Temple University
Philadelphia, Pennsylvania
5. Beulah Gundling
Author and previous holder of AAU Solo Synchronized Swimming Champion-
ships, and present holder of First Class Honors in IAAA Solo Competi-
tion
Cedar Rapids, Iowa
6. E. J. Mongeon
Assistant National Director, Safety Services and Water Safety
The American Red Cross
Washington, D. C.
7. Betty Spears
Author and Chairman of the Department of Physical Education
Wellesley College
Wellesley, Massachusetts

8. Muriel Swain
Program Committee Member of the Women's National Aquatic Forum
Skidmore College
Saratoga Springs, New York
9. Louise Wing
Program Chairman and Chairman Elect of the Women's National Aquatic
Forum for 1964
Binghamton, New York
10. Arnold Winkenhofer
Director, First Aid, Small Craft and Water Safety Services for the South-
eastern Area of the American Red Cross
Atlanta, Georgia

LETTER AND ACCOMPANYING QUESTIONNAIRE

Dear _____ :

I am beginning experimental work to develop a program of synchronized swimming skills to accompany the American Red Cross Beginner swimming progression. I am interested in developing a progression which will be appropriate for the beginning swimmer from 8 to 9 years old. It is my belief that basic synchronized swimming skills may be appropriate for young children and that they might increase motivation, enjoyment of the water and improve general swimming ability. Over and above this, I believe that proceeding from a basis such as these skills would provide, may lead to a stronger and more successful synchronized swimming program for advanced and older groups.

Your opinion, as a leader in the field of aquatics, will be of value to me in structuring the proposed research. I would like to ask you to do two things. First, check those skills on the enclosed list which you think are appropriate for beginning swimmers of this age. Second, add any skills which you think should be included in this list. Please make any comments you wish concerning the study.

Thank you for your help and cooperation.

Marilyn Eastridge

Dr. Rosemary McGee, Faculty Adviser

Red Cross Beginner Skills

(Do not check - use simply as reference)

Breath holding
 Rhythmic breathing
 Prone float
 Prone glide
 Back float
 Back glide
 Back kick glide
 Finning and flutter kick
 Front crawl
 Changing position
 Change of direction
 Turning over
 Leveling off
 Jump into deep water
 Release of cramp
 Assisting non-swimmer to feet
 Reaching assists

Your suggestions for synchronized swimming skills other than those included in the list:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Synchronized Swimming Skills

(Check those you think most appropriate for beginning swimmers, 8-10 years.)

- Sculling: head first, hands at sides
- Sculling: foot first, hands at sides
- Water walking: foot first scull, legs alternately bending downward from the knees
- Marching: head first scull, alternate lift of legs to bent-knee position
- Lobster scull, modified: face in water
- Canoe scull, modified: face in water
- Spinning top: similar to tub, but with knees apart and ankles crossed
- Tub
- Back tuck somersault
- Log roll
- Surface dives: tuck position
- Handstand
- Forward tuck somersault
- Flying porpoise
- Porpoise
- Marlin
- Oyster

___ Use of music in teaching and practice of skills

___ Use of surface patterns in practice of skills

___ Development of a simple routine using a combination of skills

Please return, in the enclosed envelope, to Marilyn Eastridge, Dept. of Health, Physical Education and Recreation, University of North Carolina at Greensboro, Greensboro, North Carolina by December 14th.

LESSON PLANS

Lesson One:

Adjustment to water

Breath holding; blowing bubbles

Prone float

Using partners for support; using flutter boards; from middle to side of pool

Prone glide

Lesson Two:

Review

Bobbing with rhythmic breathing; prone float; prone glide

Prone flutter kick

Bracket formation; with flutter boards

Prone kick glide

Lesson Three:

Jump in waist deep water

Review

Prone float and glide; kick glide; bobbing with rhythmic breathing

Jump and push off in prone kick glide

Lesson Four:

Review

Jump and push off in prone glide; prone kick glide

Arm stroke for the human stroke

Standing and with prone float

Human stroke - combination of arms and flutter kick

Dive over pole held on surface to pick up object on bottom (introduction to flying porpoise)

Tuck or turtle float

(After lesson four the groups were divided into low and high skill classifications; therefore, the remainder of the lesson plans are divided accordingly.)

Lesson Five:

High Skilled:

Review

Human stroke; flying
porpoise

Back float

With partners; alone

Front tuck somersault

Low Skilled:

Review

Prone float; prone kick
glide; human stroke

Lesson Six:

High Skilled:

Review

Jump in with push off to
prone kick glide; back float;
front tuck somersault

Back glide

Low Skilled:

Review

Jump in with push off to prone
glide; prone glide; prone
flutter kick; human stroke

Lesson Seven:

High Skilled:

Kneeling dive into shallow water

Review

Flying porpoise; back glide

Flutter kick on the back

Finning on the back

Combined finning and flutter kick
on the back

Low Skilled:

Review

Jump in shallow water; prone
flutter kick; human stroke

Flying porpoise

Tuck or turtle float

Lesson Eight:

High Skilled:

Deck practice for log roll

Review

Kneeling dive; front tuck
somersault; combined
finning and flutter kick on
the back

Low Skilled:

Review

Jump in shallow water with push
off to prone kick glide; human
stroke

Back float

With partners; alone

Log roll
 Arm stroke for front crawl
 Adjustment to deep water

Front tuck somersault

Lesson Nine:

High Skilled:

Review

Back float; finning; back
 flutter kick; combined
 back stroke

Front crawl without rhythmic
 breathing

Turning over from front to back

Practice of front and back swim-
 ming skills in deep water

Low Skilled:

Review

Human stroke; back float; front
 tuck somersault

Finning on the back

Lesson Ten:

High Skilled:

Deck practice for sculling

Sculling

Review

Flutter kick; front crawl

Practice of front and back swim-
 ming skills in deep water

Low Skilled:

Review

Prone flutter kick; back float;
 front tuck somersault

Arm stroke for front crawl

Lesson Eleven:

High Skilled:

Review

Prone glide; prone flutter
 kick; crawl arm stroke;
 front crawl; back float; back
 flutter kick; sculling; com-
 bined back stroke using
 flutter and sculling; log roll;
 front tuck somersault

Tub

Low Skilled:

Deck practice for log roll

Review

Front crawl; finning; front tuck
 somersault

Flutter kick on the back

Log roll

Lesson Twelve:

High Skilled:

Review

Front crawl; combined
back stroke; sculling; tub

Back tuck somersault

Practice of swimming skills in deep
water

Low Skilled:

Review

Front crawl; back float; com-
bined back stroke using finning
and flutter kick; log roll

Back tuck somersault

Lesson Thirteen:

Review of all skills in the order in which they were to be rated for both groups.
(The low group, not having been introduced to as many skills as the high group,
practiced only those skills on which their group would be rated.)

Lesson Fourteen:

Rating session

RATING FORM FOR BASIC BEGINNING AND BASIC
SYNCHRONIZED SWIMMING SKILLS

The purpose of this study is to develop a program of synchronized swimming skills to accompany a Red Cross Beginner Swimming progression. The skills are to be appropriate for the 8 - 10 age group. All skills - basic beginning and basic synchronized - are described in the attached sheets for the beginning swimmer. Ratings should be given with this skill level in mind.

The theory behind this study is that swimmers of this age should be capable of performing basic synchronized swimming skills and that, if they are, these would add interest, motivation and develop the watermanship of the swimmer. It might also cause more development of interest in synchronized swimming itself.

The classes have met twice a week for seven weeks for a half-hour lesson each time making a total of 14 half-hour periods. The rating session is the 14th period.

Training session: Monday, March 8th, 5:30 to 6:30 p.m. in
the Coleman Lounge

Rating session: Tuesday, March 16th, 3 to 5 p.m., YWCA,
N. Davie St.

Observation period (choose one):

Saturday, March 6th, 12 to 2 p.m.

Tuesday, March 9th, 3 to 5 p.m.

Saturday, March 13th, 12 to 2 p.m.

BEGINNING FRONT CRAWL

Description: A stroke in which the flutter kick and hand-over-hand arm action are used to propel the body forward in a prone position. The legs kick alternately and vertically from the hips. The feet, on the kick up, come to the surface but the foot does not come far enough above the surface of the water to cause the top of the foot to slap the water as it kicks down. The arms are recovered above the water with the elbow high at all times. The hand enters the water on a line with the same shoulder when the arm is just short of full extension. The pull is downward and backward - somewhat medial - but not lateral. The breathing may occur irregularly and be either a lateral rotation of the head or an extension and lift.

Ratings:

- *5 - Stroke is well coordinated; movement of arms and legs is smooth and continuous; power is sufficient to produce continuous and fast forward progress; arms are recovered with elbow high and with no drag; legs are slightly flexed at the knee and the feet remain just below the surface, or do not come up far enough to cause a slap with the top of the foot.
- 4 - Coordination is evident, but movement of arms and legs is slightly jerky with some hesitancy; forward progress is made at an adequate rate; occasional drag during arm recovery and height of elbow is not as apparent; legs are over-flexed at the knee but are still under the surface, or break slightly.
- 3 - Some coordination but arms and legs are not moving well together and there is a slowing down or speeding up of either legs or arms; forward progress is slow; continuous drag of arms during recovery with arms more extended during entire recovery; legs or feet come above the surface of the water.
- 2 - Poor coordination; movements are uncertain and hesitant with no smoothness; forward progress is very slow; arms splash a great deal, drag on recovery and are extended throughout stroke; legs are over-flexed and come above the surface continually.

1 - No coordination; movements irregular and hardly recognizable; much difficulty making any forward progress; arms are under the water during most of recovery; legs kick very irregularly and when kicking come above the surface continually.

0 - No attempt made or completely unrecognizable

*If the girl does not swim across the pool without stopping it is automatically assumed she does not warrant a rating of "5"

KICK GLIDE ON THE BACK

Description: The flutter kick is used to provide forward (head first) progress when the body is in a supine position. The arms are kept at the sides at rest. The legs kick alternately and vertically from the hips. The feet return to the surface of the water each time but do not come above it. The face remains above the water throughout.

Ratings:

- *5 - Legs move smoothly and regularly; no part of the leg or foot comes above the surface of the water; progress is fast; the face remains above the water continually; the hands provide no assistance in propulsion or position.
- 4 - Some jerkiness in leg movement; feet break the surface of the water occasionally; adequate progress; face remains above the water continually; hands provide no assistance in propulsion or position.
- 3 - Jerky leg movement; legs over-flexed at the knee and feet break the surface continually; progress is slow; face is occasionally below surface; hands assist occasionally in propulsion or position.
- 2 - Very jerky, marching-type movement of the legs; knees and feet come above the surface of the water with much splashing; very slow progress; face is under the water occasionally; hands used regularly to assist with propulsion and position.
- 1 - Erratic movement; knees and feet come above the surface continually with much splashing; has difficulty making any progress; face is almost always under the water; hands used a great deal to assist with propulsion and position.
- 0 - No attempt made or completely unrecognizable.

*If the girl does not swim across the pool without stopping it is automatically assumed she does not warrant a rating of "5".

SCULLING

Description: The hands alone provide forward (head first) propulsion with the body in a back layout position. The arms and hands are along the sides moving out in the scull to approximately a 45 degree angle and returning to the body. A push-pull, figure eight movement is made by the hands when sculling. The wrists are extended throughout. The pressure is always exerted by the palm of the hand against the water. The head is in line with the body, ears under the surface of the water. Hips are up and feet are at or near the surface. The body should be stretched.

Ratings:

- *5 - Body is stretched - head, hips, knees and feet in line; legs together; arms are extended throughout; wrists are extended with fingers turned up; arms and hands stay close to body during scull; progress is fast.
- 4 - Body in line except for feet which are dropped slightly; legs together; arms slightly flexed at the elbow; wrists are extended with fingers turned up; arms and hands stay close to body on the scull; progress is adequate.
- 3 - Head raised slightly so ears are above surface, feet are dropped slightly and legs are apart; arms flexed at the elbow; wrists have only a slight extension with the hand almost flat; arms and hands go beyond the 45 degree angle on the scull; progress is slow.
- 2 - Head raised, hips dropped, feet dropped; legs apart; a great deal of flexion at the elbow; wrist is not extended, hand is flat; arms and hands make a wide sweep beyond the 45 degree angle on the scull; progress is very slow.
- 1 - Body completely out of line and balance is maintained with difficulty; a finning movement of flexion and extension is used - a "push-recovery" rather than a "push-pull" movement; difficulty making progress.
- 0 - No attempt is made or completely unrecognizable.

*If the girl does not swim across the pool without stopping it is automatically assumed she does not warrant a rating of "5".

TUB

Description: This stunt begins in a back layout. The hips are dropped, the knees are flexed and drawn toward the chest as the lower legs slide along the surface of the water until the thighs are perpendicular to the surface. The knees and feet remain at the surface during rotation. The face is out of the water. The body is sculled so that it rotates in one complete circle in either direction. The stunt finishes in a back layout.

Ratings:

- 5 - Knees and feet are together and are just at or only slightly below or above the surface; face is above water and eyes are focused on knees; rotation is complete and almost smooth, with only slight jerkiness.
- 4 - Knees and feet apart and just at or only slightly below or above the surface; face is above water and eyes are focused on knees; rotation is complete but jerky.
- 3 - Knees and feet apart and under the surface during whole rotation; head is back and eyes are focused upward; rotation is complete but jerky.
- 2 - Knees and feet apart with knees above the surface, feet below; head is either too far forward or too far back; rotation is complete but movements are erratic and the body drops in the water.
- 1 - Knees and feet apart and under the water; head either under the water or quite far forward; rotation is not complete and all movements are jerky.
- 0 - No attempt is made or completely unrecognizable.

LOG ROLL

Description: The stunt begins from a back layout position, arms overhead. The body is rotated, by twisting the body, without the use of the hands and arms or feet and legs. The movement is from back, to front, to back in a continuous roll. The face submerges as the body rolls to the front.

Ratings:

- 5 - The body is stretched and extended throughout; legs and feet are together; hands are together; complete rotation is made with ease; body stays at or near the surface of the water.
- 4 - Body is stretched and extended throughout; legs are apart but not kicking; hands are apart but not pushing to aid rotation; rotation is complete but slightly jerky; legs drop during rotation.
- 3 - Body does not stay extended throughout; legs are apart and assist in rotation; arms are apart but do not assist; rotation is complete but jerky; legs drop during rotation.
- 2 - Body does not stay extended; both legs and arms are apart and assist in rotation; rotation is complete but made with difficulty; legs drop almost to bottom.
- 1 - Body is not extended; arms and legs assist rotation with much splashing; rotation is partially completed; legs drop almost to bottom.
- 0 - No attempt made or is completely unrecognizable.

BACK TUCK SOMERSAULT

Description: The stunt is started from a standing position. A tight tuck is formed as the body pushes off with a backward thrust; chin tucked, knees to chest, heels to hips. The arms push down from a forward parallel position and continue to rotate until the body is turned. The stunt ends in a standing position.

Ratings:

- 5 - Knees and feet together; body is tightly tucked throughout rotation; complete rotation is made easily with only backward, and no sideward direction; balance is regained easily.
- 4 - Knees and feet together; body is loosely tucked throughout rotation; complete rotation is made easily with only backward, and no sideward, direction; slight difficulty in regaining balance.
- 3 - Knees and feet apart; loose tuck is held; complete rotation is made with slight difficulty and with slight sideward direction; slight difficulty in regaining balance.
- 2 - Knees and feet apart; very loose tuck or irregular tuck (beginning tightly and opening up during rotation); rotation is made with difficulty and with some sideward direction; difficulty in regaining balance.
- 1 - Knees and feet apart; loose or irregular tuck; rotation is only partially completed; much difficulty in regaining balance.
- 0 - No attempt made or completely unrecognizable.

RAW SCORES

Total number of points possible for general swimming skills - 100

Total number of points possible for synchronized swimming skills - 100

Total number of points possible for all skills - 200

Groups		general swimming skills	synchronized swimming skills	all skills
Group I (High Skill)				
Subject number	1	46	34	80
" "	2	26	22	48
" "	3	46	60	108
" "	4	74	68	142
" "	5	36	66	102
" "	6	63	42	105
" "	7	39	41	80
" "	8	73	40	113
" "	9	12	17	29
" "	10	48	41	89
" "	11	36	46	82
" "	12	58	65	123
" "	13	21	23	44
" "	14	26	23	49
" "	15	24	27	51
" "	16	17	25	42
" "	17	65	45	110
Group II (Low Skill)				
Subject number	18	9	0	9
" "	19	2	0	2
" "	20	14	5	19
" "	21	29	7	36
" "	22	23	0	23
" "	23	15	5	20
" "	24	8	7	15
" "	25	0	0	0
" "	26	8	1	9
" "	27	20	9	29
" "	28	25	4	29
" "	29	23	13	36

RAW SCORES (continued)

Groups	general swimming skills	synchronized swimming skills	all skills
Subject number 30	8	0	8
" " 31	16	11	27
" " 32	0	0	0