1971

# The Status of Aquatics Programs in Selected Colleges and the Development of an Aquatics Handbook

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# THE STATUS OF AQUATICS PROGRAMS IN SELECTED COLLEGES AND THE DEVELOPMENT OF AN AQUATICS HANDBOOK

BY

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A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science, Major in Health,
Physical Education and Recreation
South Dakota State University

1971

THE STATUS OF AQUATICS PROGRAMS IN SELECTED COLLEGES AND THE DEVELOPMENT OF AN AQUATICS HANDBOOK

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable as meeting the thesis requirements for this degree, but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Advisor Date

Head, Department of Health, Physical Education and Recreation Date

## ACKNOWLEDGMENTS

The writer wishes to express his sincere appreciation to his advisor, Professor Glenn E. Robinson, for his encouragement and assistance in the completion of this thesis.

The writer also expresses his appreciation to his college swimming coach, Professor Richard E. Newman, for his inspiration and guidance and to the writer's typist, Eileen Schuelke, for her patience and assistance in typing this thesis.

This thesis is also an installment on a debt which can never be paid in full to the writer's parents, Mr. and Mrs. Glen L. Hunter.

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# CHAPTER I

# INTRODUCTION

## Significance of the Study

It is the firm belief of the writer that all people should hav the opportunity to learn to swim, and those with the ability to swim should have the opportunity to polish and improve their aquatic skills While YMCA's, YWCA's, municipal operated pools and high schools offer such opportunities, the logical place for a college student to learn and perfect his or her skills is in the college they have chosen to attend. If all college students are to learn, swimming instruction ca be done nowhere else so professionally and inexpensively.

During the decade 1910 to 1920, many states enacted laws requiring physical education for all students. At the same time, ther was a growing interest in swimming as a physical activity. From 1930 to 1939 there were increasing numbers of swimming pools built by colleges and universities. Unfortunately, only a few of these pools were planned to serve primarily as instructional facilities or were integrated with the school plant and program.[1]

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[1]Donald W. Nielson and John Nixon, Swimming Pools for Schools, ed. William R. Odell (Stanford: Stanford University Press, 1954), p. 2.

It was not particularly surprising, therefore, to find in Worl War II that only about one-half of the young men inducted into the United States Naval Service were able to swim.[2] This necessitated the teaching of nearly four million men how to take care of themselves in the water during a period when time was at a premium.[3]

At the conclusion of the war, authorities began trying to resolve these deficiencies. The writer is aware that many colleges in South Dakota have at present implemented swimming as part of the physical education curriculum, others will undoubtedly do so in the future with construction of needed facilities.

Indeed, many authorities believe that swimming should be considered the prime activity in every physical education curriculum and that every college, university, and even high schools should plan to build or acquire use of a swimming pool. The Committee on Curriculum Research of the College Physical Education Association pointed out tha it is necessary for every college student to learn to swim. The Committee, moreover, advocated that swimming be made an actual requiremer for graduation.[4]

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[2]United States Naval Institute, The Naval Aviation Physical Training Manuals, Vol. VIII, Swimming (Annapolis: United States Naval Institute, 1944), p. 9.

[3]Ibid.

[4]William R. LaPorte, The Physical Education Curriculum--A National Report (Los Angeles: University Press, University of Southern California, 1932), p. 24.

Nielson and Nixon state that universities and colleges must offer physical activity programs which will develop skills and knowledge beneficial to physical development, mental health, and lifetime recreational skills. Swimming is one of the best all-around physical activities and should become an integral part of the physical educatio and university program when facilities are available for instruction.[5]

The analysis of a swimming program will disclose that although emphasis is placed on teaching all students to swim there are other reasons for its inclusion. Three separate studies conducted more than twenty-five years apart have indicated that of all the activities in the physical education curriculum, swimming is foremost in benefits and enjoyment for the individual and group.[6,7,8]

The National Safety Council for more than fifty years has stressed that accidents may be prevented. One form of prevention is to teach people to swim in places where it is safe. A pool built and

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[5]Nielson and Nixon, loc. cit.

[6]LaPorte, op. cit., p. 26.

[7]Floyd V. Sluiter, "The Attitudes of Men Students Toward Required Physical Education at South Dakota State College" (unpublished Master's thesis, South Dakota State College, Brookings, South Dakota, 1959), p. 32.

[8]Peggy M. Foss, "The Attitudes of South Dakota State College Women Students Toward Physical Education" (unpublished Master's thesis South Dakota State College, Brookings, South Dakota, 1960), p. 58.

maintained by an institution with the necessary lifeguards is far safe than "the ole' swimmin' hole." The National Safety Council states that the third ranking cause of accidental death is drowning.[9]

Source material in the field of swimming and diving is amazingly limited.[10] With a physical education complex of the magnitude of South Dakota State University's new center, a handbook covering an operation new to the physical education program would be both desirabl and necessary.[11] No other recreation facility approaches the design diversification and complexity of a swimming pool, nor does any other facility have as many "rules", "regulations", and "laws" governing its operation.[12]

Statement of the Problem

The purpose of this study was to determine the status of aquat ics programs of selected universities and colleges and to develop for South Dakota State University a handbook comprehensively covering the facets of an excellent aquatics program to be used in conjunction with the yet-to-be completed University Natatorium.

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[9]Nielson and Nixon, op. cit., p. 3.

[10]David A. Armbruster and others, Swimming and Diving (St. Louis: C. V. Mosby Company, 1968), p. 5.

[11]Council for National Cooperation in Aquatics, Swimming Pools A Guide to Planning, Design and Operation, ed. M. A. Gabrielson (Ft. Lauderdale: Hoffman Publications Inc., 1969), p. 176.

[12]Ibid., p. 7.

## Limitations and Delimitations

1. Data were obtained from aquatics directors and swimming coaches in colleges and universities the approximate size of South Dakota State University in all fifty states.

2. Data were obtained from personal communication between the writer and swimming coaches throughout the United States.

3. The handbook developed was designed for use especially by South Dakota State University. All references made to design or facility are made for implementation to South Dakota State University's projected Aquatics Natatorium and program.

## Definition of Terms

N.C.A.A. Referred to forthwith as NCAA, National Collegiate Athletic Association, governing body for intercollegiate sports.[13]

C.N.C.A. Referred to forthwith as CNCA, Council for National Cooperation in Aquatics. A national aquatics organization composed of agencies and individuals connected with aquatics.[14]

S.C.U.B.A. Referred to forthwith as SCUBA, Self-Contained Underwater Breathing Apparatus.

Basic Instruction. The part of the aquatics program that deal with beginning swimming at South Dakota State University. These are designated with the title HPER 101-121.

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[13]Ibid., p. 224.

[14]Ibid.

pH. A measure of the degree of acidity of a solution on a scale of 1 to 14. Distilled water has a pH of 7.0. Acids have a pH of 7.0 down to 1.0 in order of increasing acidity. Bases or alkalies have a pH of 7.0 to 14.0 in order of increasing strength.[15]

A.R.C. Referred to forthwith as ARC, American Red Cross, one of the agencies whose swimming programs are available to all persons and are designed on a progression of skill basis.

Chlorine. Chlorine is the chemical most commonly used for killing bacteria in swimming pools. It can be added to the water in many ways. Chlorine in its pure form at room temperature is a greenish, rather heavy and very deadly gas.[16]

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[15]Ibid., p. 110.

[16]Ibid., p. 105.

## CHAPTER II

## REVIEW OF THE RELATED LITERATURE

The search of the literature revealed that the majority of sources were in the form of books and reports which were edited by one person or by the Council for National Cooperation in Aquatics. While opinions of many specialists in the field of aquatics were used in the reported literature, no references were made to the specific individua contributors.

### Literature Related to Need for Swimming Instruction

Authorities have estimated that about 110,000,000 people in th United States participate annually in some form of aquatics activity, and this figure is constantly increasing. However, according to Stack and Siebrecht, "of the millions who frequent swimming areas each year, less than 10 percent swim skillfully."[1]

According to the National Safety Council, the death rate from drowning in 1913, the year the water safety movement was formally organized, was 10.4 per 100,000 persons or a total of 10,000 deaths. Since 1913, participation in all forms of aquatic activity has increas enormously and if the death rate of 1913 had prevailed in 1967, the number of drownings for that year alone would have increased nearly

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[1]H. J. Stack and E. B. Siebrecht, Education for Safe Living (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1945), p. 5.

twofold just on the basis of population increase. Instead, because of growth of water safety consciousness, the death rate has been reduced as low as 3.4 per 100,000 persons.[2]

Flagg has stated that "asphyxia in its various forms has been estimated to claim about 50,000 victims yearly in the United States."[3]

The National Safety Council contends that:

> The 6,400 deaths caused by submersion asphyxia in 1967 included 3,900 non-swimming fatalities consisting principally of persons falling from docks, bridges, shores, etc., transport accidents, recreational boating, fishing, ship repair, and so on, plus accidents in the home and on home premises. Approximately 2,500 drownings were persons swimming or playing in the water.[4]

The National Safety Council continues by stating that the importance of drowning as a cause of death among young people is further emphasized by the fact that although motor vehicle accidents caus more deaths than any other type of accident the principal non-vehicle type of accident for the young and active ages is drowning.[5]

Gabrielson in a study of causes of drownings stated that more males drown than females and the ratio is about 6 to 1. While all states reported drownings, the more heavily populated states had the largest number but a lower rate per 100,000 population. The states wi

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[2]National Safety Council, Accident Facts (Chicago: National Safety Council, Inc., 1968).

[3]P. J. Flagg, The Art of Resuscitation (New York: Reinhold Publishing Corporation, 1944), p. 2.

[4]National Safety Council, loc. cit.

[5]Ibid.

smaller populations had fewer drownings but a higher rate per 100,000 population. . .the educational level of the victims was not correlated with the drowning rate. While most of the people who drowned were non swimmers, there were a few instances of accomplished swimmers drowning Persons in normal health comprised the majority of the drowning victims, though there were cases of cardiac arrest, epilepsy, and mental illness. Nine and one-half percent were under the influence of alcoho and 3.3 percent were ill in some other way. A majority of the victims had never had swimming instruction. Most all had violated good safety procedures such as going into a small craft when unable to swim, swimming in an area that was not patrolled, or leaving a child unattended near water. Lakes comprised scenes of more drownings than any other body of water, although there were cases of drownings in slop buckets and bath tubs. Only 2.2 percent of the fatal drownings occurred in areas patrolled by lifeguards.[6]

According to Gabrielson:

> The fact that so many people in the United States do not know how to swim is more or less an indictment against the public schools of our country. It is unfortunate that facilities are not being provided to allow compulsory swimming programs in our schools. Huge edifices are built to seat thousands for a basketball game, but there is not enough concern for the safety of children to "drown-proof" them by teaching them to swim. Swimming pools are still thought by some educators as a luxury. The first thing to be dropped from a building program when money is to be saved is the swimming pool.[7]

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[6]M. A. Gabrielson, Aquatics Handbook (Englewood Cliffs, N. J. Prentice-Hall, Inc., 1960), pp. 12-13.

[7]Ibid., p. 14.

In a university with a swimming pool, 95 percent of the students can eventually learn to swim. Then, with the dissemination of information on good safety practices in aquatics through physical education programs, a university community could soon point with pride to a record of no drownings for many consecutive years.[8]

In summary, the literature surveyed is in agreement that most drownings occur because of lack of knowledge and skill in the area of aquatics. Also, if the rate of accidental drownings is to be reduced to a negligible level, a comprehensive aquatics program must be integrated into the university curriculum.

## Literature Related to Intramural Aquatics Programs

Unlimited references could be reviewed concerning the need of an intramural aquatics program. However, only a very brief discussion of this recognized need is included in this chapter.

The American Association of Health, Physical Education, and Recreation states:

> Intramural sports make an important contribution to the life of todays college student. They help young men and women develop socially, emotionally, and physically as well as adding directly to their educational experiences. A major role of college intramural activities is to encourage the continued pattern of physical activity which is so essential to the well being of our citizenry.[9]

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[8] Ibid.

[9] American Association of Health, Physical Education, and Recreation, Intramural Sports for College Men and Women (Washington: American Association of Health, Physical Education, and Recreation, 1964), p. iii.

The AAHPER asserts that the years a young man or woman spend in college, where concentrated study is often demanded, could constitute a serious physical activity gap between mandatory high school physical education classes and sports activity and the leisure-time recreational sports of adult life. The college intramural sports program bridges this gap.[10]

Robertson feels that "the swimming pool should be available every day for some sort of intramural swimming. Certain days and times should be set aside for students and certain days and times should be set aside for members of the faculty and their families."[11]

Robertson also states that "programs should include all forms of competitive swimming. Synchronized swimming and water ballet are very popular with the women students and should be included as part of the program."[12]

## Literature Related to the Staffing of an Aquatics Facility

The Council for National Cooperation in Aquatics reports:

> For a pool to be successful it must be properly administered. It is not sufficient to merely hire someone to run the pool and then forget about it. Good management

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[10] Ibid.

[11] David Robertson, "Organizing a School-Community Aquatics Program," Aquatics Handbook, ed. M. A. Gabrielson (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1960), p. 20.

[12] Ibid.

> involves many intricate functions which require careful preparation and execution. One essential point in administration is that only one department should be responsible for operation of the pool.[13]

The CNCA further reports:

> The first step in staffing a new pool involves the accurate analysis of the jobs which are to be performed. Generally, the jobs fall into three categories: (1) administration, (2) instruction and supervision, and (3) operation and maintenance. The specific number of people needed to operate a pool will depend on the size, capacity of the pool floor plans, scope of the program, and number of hours the pool is open each day.[14]

The CNCA also reports that after each job has been analyzed a concise description of the job needs to be prepared. Every pool should develop its own to meet unique situations.[15]

Goff contends that most schools do not have a budget for large swimming staffs within the athletic department. Generally, a swimming coach is fortunate if he can hire a full-time diving coach or assistant swimming coach. Since there is a diversity of swimming workouts and training programs for the college swimmer (who is usually a specialist and cannot participate in a mass workout plan) the college coach finds it very difficult to give individual instruction to his

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[13]CNCA, op. cit., p. 172.

[14]Ibid., p. 173.

[15]Ibid.

swimmers each day throughout the season. Therefore, help is needed if the program is to succeed and improve. The best way to find help in coaching is through graduate assistant help.[16]

Going further, Goff writes that graduate assistants should be recruited vigorously. A good graduate assistant need not be a former All-American, but a knowledgeable student of the sport. Such assistants can also be of valuable aid in the recruiting of good swimmers and students.[17]

Armbruster, Allen and Billingsley state that the aquatics director's main concern is the overall operation of a safe, sanitary swimming facility. He is responsible for the hiring and supervision of personnel and the administration and maintenance of the swimming pool complex.[18]

Hubbard and others report that a key to safety is well-trained personnel. Not enough attention has been given to this phase of the aquatics program. A lifeguard with a Red Cross certificate may not be adequately trained for the job. He must have additional training and the aquatics director must understand this.[19]

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[16]Robert Goff, "A First Class Swimming Program," Swimming Technique, Vol. VII, No. 2, p. 34.

[17]Ibid.

[18]Armbruster, Allen, and Billingsley, op. cit., p. 336.

[19]Charles Hubbard and others, "Swimming Pool Operation, Maintenance, and Programming," Twelfth Annual Meeting, Council for Nationa Cooperation in Aquatics, ed. T. Hutson (Washington: Council for National Cooperation in Aquatics, 1962), p. 50.

Armbruster, Allen, and Billingsley also state that "the local American National Red Cross may be of great assistance to the pool operator by supplying the names of qualified water safety instructors to serve as student assistants."[20]

According to Armbruster, Allen and Billingsley:

> The lifeguard is directly responsible to the aquatics director. His primary function is the safety of the pool and the supervision of the participants. In the absence of the aquatics director he should assume full responsibility for the pool safety and operation. He should be mature, experienced, and a leader, capable of following orders as well as giving them.[21]

Armbruster, Allen, and Billingsley contend "that female lifeguards may be employed to supervise shallow water areas, to teach aquatic art and synchronized swimming."[22]

Literature Related to Maintaining an Aquatics Facility

It is not the purpose of this section to report on the chemistry, filter, and daily maintenance of a swimming pool, but rather to survey the literature concerning the basic duties of maintenance.

Chester Products Incorporated report that good pool maintenance is just like good housekeeping. It will add greatly to the pleasurable use of the pool. Swimmers will enjoy their instruction and recreation all the more in a clean, orderly, well-kept pool. Also

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[20]Armbruster, Allen, and Billingsley, op. cit., p. 338.

[21]Ibid.

[22]Ibid.

administrators and operators will find continuing cleanliness is much easier than "spasmodic field days." Doing a little every day is much easier than having to do "alot" every so often.[23]

Mahoney contends that a prime objective in pool maintenance is sanitary cleanliness for which there can be but one standard and which in itself makes a pool attractive.[24]

Armbruster, Allen and Billingsley state that "the person charged with the control of the swimming pool water is vital to the sanitation of the pool operation. He must be thoroughly familiar with the filter plant, its operation, and the treatment of swimming pool water."[25]

Armbruster, Allen and Billingsley continued by stating that the person in charge of maintenance should keep a daily record of the pool operation and should note the following items:

1. Number of persons using the pool per day and peak load.
2. Water and air temperature.
3. Chemicals used such as soda ash and alum and record the amount added to the water.

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[23]Chester Products, Inc., Pool and Filter Instruction Data (Hamilton, Ohio: Chester Products, Inc.), p. 7.

[24]Jay-Ehret Mahoney, Twelfth Annual Meeting, Council for National Cooperation in Aquatics, ed. T. Hutson (Washington: Council for National Cooperation in Aquatics, 1962), p. 50.

[25]Armbruster, Allen and Billingsley, op. cit., p. 339.

4. Disinfectant, the number of hours of operation, machine setting, and amount used.

5. Disinfectant residual, in parts per million, measured at all corners of the pool.

6. When filters are backwashed.

7. The pH of the water.

8. Water to be added.

9. Hours the water is being recirculated.

10. Condition of the water.

11. Any unusual occurrences such as motor breakdown, chlorinator breakdown, loss of electricity.[26]

Literature Related to Pool Equipment and Accessories

The equipment and accessories for any well-planned aquatics facility must meet the standards as set by agencies governing the pool operation and competition.

According to Armbruster, Allen and Billingsley, swimming pools should be constructed after thorough investigation as to length, width and depth suitable for instruction, recreation, and competition. Usually there is a strong sentiment expressed by committees that a poo should be built for general swimming only and not for competition. Committees who have been mislead by such false sentiment find out late

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[26]Ibid., p. 340.

that it is very expensive to make later changes in construction and equipment for purposes of holding competitive meets. The modern aquatics facility should be constructed and equipped to combine all functions of a comprehensive program.[27]

Essential Safety Equipment. According to the CNCA, the equipment needed includes lifeguard chairs, safety lines, ring buoys, torpedo buoys, reaching poles, shepherds crook, first aid kits, and mouth-to-mouth resuscitation devices or inhalators.[28]

Mahoney says the lifeguard chairs should be placed even with the edge of the pool and elevated several feet. When a guard is up six feet in the air and back from the edge of the deck, there is a blind area at least two feet wide at the base of the pool wall.[29]

Mahoney goes on to assert that the safety line is a must for any aquatics facility. Without a safety line you always risk the dange of someone stepping "off the deep end."[30]

The CNCA reports that floors and stairs in the dressing room, in the entranceway area, and on the pool deck are potential wet areas. Some type of floor covering is essential. Unfinished concrete usually encourages the growth of fungus and attracts dirt and other undesirable

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[27]Armbruster, Allen and Billingsley, op. cit., p. 333.

[28]CNCA, op. cit., p. 146.

[29]Mahoney, op. cit., p. 51.

[30]Ibid.

material which produces objectionable odors, and may even be the source of transferring "athletes foot" from one swimmer to another. The ideal floor cover is ceramic non-slip tile. Concrete, if not painted, should at least be sealed to make it impervious to fungus. Concrete floors in potentially wet areas should never be troweled smooth (float finish) since they will be too slippery. There are acceptable paint products on the market containing abrasives which make them comparatively non-slip.[31]

Instructional Equipment. The CNCA reports that "basic equipment usually provided includes kickboards, goggles, masks, snorkels, inflatable tubes or rings, a teaching pole (with a six-inch loop at the end to slip over one arm), and racks and hangers for equipment."[32]

The American Red Cross maintains that an institution who instructs in lifesaving skills have available for use a small canoe for instruction in small craft safety.[33]

Intramural and Competition Equipment. All equipment purchases for an aquatics facility should meet the minimum standards set forth by the NCAA to alleviate any facility changes or purchase of almost identical accessories to meet the requirements of the governing agency.

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[31]CNCA, op. cit., pp. 135-136.

[32]Ibid., p. 147.

[33]American Red Cross, Lifesaving and Water Safety (Washington: American National Red Cross, 1968), p. 18.

According to the CNCA, the surface racing lanes must be a part of the pool facility. Anchorages in the wall of the pool must be permanent.[34]

The National Collegiate Athletic Association states that "tightly stretched, easily visible floating lane markers joining to form a continuous cylinder marking the lateral limits of each lane must be available for championship meets."[35]

The CNCA reports that "the starting blocks should be detailed on the drawings and specified as part of the pool contract."[36]

The NCAA states that "starting blocks, front edge 30 inches above the surface of the water and flush with the end of the pool, are required for championship meets. The take-off may be sloped toward the pool not more than 10 degrees from the horizontal."[37]

The NCAA also states that "firm starting grips flush with the end of the pool and no higher than 30 inches must be provided for backstroke starts."[38]

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[34]CNCA, op. cit., p. 148.

[35]National Collegiate Athletic Association, Official Swimming Guide, ed. Vic Gustafson (Phoenix: College Athletics Publishing Service, 1970), p. 12.

[36]CNCA, op. cit., p. 148.

[37]NCAA, op. cit., p. 12.

[38]Ibid.

The CNCA says that pennant marking lanes for the backstroke turn indicators can be provided by the aquatics director.[39]

The NCAA states that:

> At least three triangular pennants of contrasting colors must be suspended over each lane from a line seven feet above the water surface and fifteen feet from each end of the pool. These pennants must be 6 to 12 inches in width and 12 to 18 inches in length.[40]

The CNCA reports that diving equipment, diving board, diving stand and geared fulcrum must be part of the pool facility.[41]

The NCAA states:

> The springboards should be one meter and three meters above the water level at the tip end. They should be 16 feet long by 20 inches wide with the entire length of the upper surface adequately covered with non-skid material. The springboards must be installed so that the board is level though the fulcrum be moved to varying positions. In all springboard championships, diving equipment approved by the meet committee shall be used, and a fulcrum of a type readily adjustable by mechanical means between dives shall be required for both one-meter and three-meter standards.[42]

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[39] CNCA, loc. cit.

[40] NCAA, loc. cit.

[41] CNCA, loc. cit.

[42] NCAA, op. cit., p. 29.

# CHAPTER III

## METHODS AND PROCEDURES

### Organization of the Study

The purpose of this study was to determine the status of aquatics programs of selected universities and colleges and to develop for South Dakota State University a handbook comprehensively covering the facets of an excellent aquatics program to be used in conjunction with the yet-to-be completed University Natatorium.

To achieve these purposes the writer investigated the following areas: the need for aquatics instruction in the university environment, the use of the aquatics facility for aquatics programs other than basic instruction, staffing, maintaining, and equipping an aquatics facility. From the data collected and from research reviewed, the manual for pool operation and program was developed.

### Source of Data

Data were collected from aquatics directors and swimming coaches of colleges and universities the approximate size of South Dakota State University in all fifty states. The list of aquatics directors and swimming coaches surveyed appears in Appendix A.

Data were also obtained through informal discussions and from random comments, both written and oral, of specialists in the aquatics field. Such information was collected at professional meetings, clinics, and swimming and diving meets at the dual, championship, and national levels.

Collection of Data

The survey method utilizing the questionnaire technique was used in collection of data. Scott states that the general purposes of the survey are to reveal current conditions, point up the acceptability of the status quo, and show the need for changes.[1]

Good and Scates state that the versatility of the questionnaire and the freshness of its returns render it an indispensible instrument for securing current information.[2]

In preparing the first draft of the questionnaire for aquatics directors and swimming coaches, the writer conferred with aquatics directors, pool managers, swimming coaches, swimming instructors, lifeguards, athletic directors, and professors as to the feasibility of the study and for their suggestions. There was agreement that such a study was needed and would be worthwhile. The first draft of the questionnaire was formulated. The writer consulted with his advisor, a staff member of the Health, Physical Education, and Recreation Department of South Dakota State University for additions, corrections and deletions.

The second draft of the questionnaire was submitted to a group of twelve persons who had experience operating, maintaining, and

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[1]Gladys M. Scott, Research Methods in Health, Physical Education, and Recreation (New York: Harper and Brothers Company, 1967), p. 253.

[2]Carter V. Good and Douglas E. Scates, Methods of Research (New York: Appleton Century and Crofts, Inc., 1954), p. 614.

working in various capacities in an aquatics facility. The questionnaire was administered to the above persons for the purpose of determining clarity and reliability. The suggestions of these people were also used in formulating the final draft of the questionnaire. The final draft was again presented to the writer's advisor for acceptance. A copy of the questionnaire appears in Appendix B.

A letter of transmittal and sponsorship (Appendix C) was prepared. The letter and the corresponding questionnaire were mailed on November 6, 1970, to 193 aquatics directors and swimming coaches of colleges and universities in all fifty states. This figure represents a sample of colleges and universities the approximate size of South Dakota State University that were known to have aquatics programs. Included was a self-addressed envelope for the return of the completed questionnaire and all were urged to return the completed questionnaire at their earliest convenience. On November 30, 1970, a follow-up letter (Appendix C) was mailed to all aquatics directors and swimming coaches who had not returned the completed questionnaire in an effort to secure a greater return. A personal letter was sent to the remaining aquatics directors and swimming coaches that did not reply to the follow-up letter.

## Summary of the Returns

Of the 193 questionnaires sent out to aquatics directors and swimming coaches at colleges and universities the approximate size of South Dakota State University in all fifty states, 158, or 81.87 percent of the questionnaires were completed and returned.

# CHAPTER IV

## ANALYSIS AND DISCUSSION OF RESULTS

The purpose of this study was to determine the status of aquatics programs of selected universities and colleges and to develop for South Dakota State University a handbook comprehensively covering the facets of an excellent aquatics program to be used in conjunction with the yet-to-be completed University Natatorium. Chapter IV presents the analysis of the data obtained by use of the questionnaire and discussion of these statistics as they pertain to the purpose.

### Source of the Data

A questionnaire was mailed to swimming coaches and aquatics directors of colleges and universities the approximate size of South Dakota State University in all fifty states. One hundred fifty-eight of the one hundred ninety-three of the aquatics directors and swimming coaches surveyed returned the questionnaire.

### Organization of the Data for Analysis

The data obtained from the surveys are reported in table form revealing the number of answering respondents and the percentage of those responding as it pertains to the total reporting population. The results are shown in the tables and the implications of the results are discussed following each table.

Table I represents an information question seeking to establish a percentage of the colleges and universities with an established aquatics program who use a handbook covering pool operation and maintenance.

TABLE I

AVAILABILITY OF HANDBOOK FOR STAFF AND EMPLOYEES THAT COVERS SWIMMING POOL OPERATION AND MAINTENANCE

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we have a handbook | 42 | 26.58 |
| NO, we do not have a handbook | 116 | 73.42 |
| Total Number of Responses | 158 | 100.00 |

Forty-two, or 26.58 percent of the aquatics directors and swimming coaches taking part in the survey indicated they do have a handbook available to staff and employees covering pool operation and maintenance. One hundred sixteen, or 73.42 percent of the respondents indicated they do not have such a manual available to staff and employees.

An aquatics director whose university does not have an aquatics handbook available commented on this question, "I think this is a wonderful idea. I think every program should have a booklet available. I know for certain we should." Another aquatics director whose college

utilizes an aquatics handbook commented, "We have distributed to all personnel our handbook on pool operation for the past four years, and I am sure that our operation could never get along without one now to clarify duties and to provide 'written rules' where only 'unwritten rules' existed before."

Table II shows who has the responsibility of administrating and overseeing the aquatics program.

TABLE II

WHO ADMINISTERS AND OVERSEES THE AQUATICS PROGRAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| Full-Time Aquatics Director | 76 | 48.10 |
| Several Share the Responsibility | 82 | 51.90 |
| Total Number of Responses | 158 | 100.00 |

Seventy-six, or 48.10 percent of the aquatics directors and swimming coaches reporting indicated that their college or university employed a full-time aquatics director. Eighty-two, or 51.90 percent of the respondents indicated that they are associated with a college or university where several members of the physical education faculty shared the responsibility of administering and overseeing the aquatics program.

One of the respondents commented that "the aquatics director has teaching and coaching responsibilities as well as aquatics administration." This comment was typical of the remarks noted on this question.

In determining the percentage of colleges and universities who carry liability insurance specifically covering the aquatics program, the following data are reported in Table III.

TABLE III

LIABILITY INSURANCE SPECIFICALLY COVERING THE AQUATICS PROGRAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we carry specific liability insurance | 48 | 30.38 |
| NO, we do not carry specific liability insurance | 110 | 69.62 |
| Total Number of Responses | 158 | 100.00 |

Forty-eight, or 30.38 percent of the reporting aquatics directors and swimming coaches indicated that their institution did carry liability insurance specifically covering the aquatics program. One hundred ten, or 69.62 percent of the reporting aquatics directors and swimming coaches indicated that they are employed by colleges and universities whose liability insurance did not cover specifically the aquatics program.

One swimming coach reported, "Our insurance covers the whole physical education operation; we do, though, have separate insurance for athletics, swimming included." Another respondent commented, "We do have insurance covering aquatics but it is part of a university wide blanket policy."

Table IV indicates the number of institutions employing graduate assistants to help with the aquatics program.

TABLE IV

DATA OBTAINED CONCERNING USE OF GRADUATE ASSISTANTS IN AQUATICS PROGRAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we hire graduate assistants specifically to help with the aquatics program | 53 | 33.54 |
| NO, we do not hire graduate assistants specifically to help with the aquatics program | 105 | 66.46 |
| Total Number of Responses | 158 | 100.00 |

Fifty-three, or 33.54 percent of the aquatics directors and swimming coaches surveyed indicated that graduate assistants are hired specifically to help with the aquatics program, while one hundred five, or 66.46 percent of the respondents indicated that their institution did not hire graduate assistants specifically to help with the aquatics program.

One swimming coach commented, "I wish we did. The administration seems to think coaching swimming and diving is a one-man job." Another commented, "The university hires GTA's (graduate teaching assistants) to help with P.E. classes and coaching, but not specifically for each area of our P.E. program."

In determining when lifeguards were required to be on duty in the pool area, the following data are reported in Table V.

TABLE V

REQUIRING LIFEGUARDS IN ADDITION TO THE INSTRUCTOR TO BE ON DUTY WHENEVER THE POOL IS IN USE

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, lifeguards are required in the pool at all times | 48 | 30.38 |
| NO, lifeguards are not required at all times | 110 | 69.62 |
| Total Number of Responses | 158 | 100.00 |

Forty-eight, or 30.38 percent of the aquatics directors and swimming coaches surveyed required lifeguards to be on duty whenever the pool is open. One hundred ten, or 69.62 percent of the aquatics directors and swimming coaches indicated that lifeguards are not required to be on duty whenever the pool is open.

One aquatics directors commented, "Our small sized classes make it unnecessary for a lifeguard to be present. The swimming instructor can do both jobs but we do require guards for all open swimming." Another aquatics director stated:

> We require a lifeguard to be on duty whenever there are more than 15 people in the pool. This discourages large classes because the college doesn't want to pay both an instructor and a lifeguard for classes that could be handled by one person. The only exception to this rule is varsity swimming.

Table VI indicates the responses of the aquatics directors and swimming coaches as to the policy of pool scheduling.

TABLE VI

SCHEDULING OF POOL TIME

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, Aquatics Director Schedules | 80 | 50.64 |
| NO, others assist | 78 | 49.36 |
| Total Number of Responses | 158 | 100.00 |

Eighty, or 50.64 percent of the aquatics directors and swimming coaches surveyed indicated that the aquatics director is in charge of all swimming pool scheduling, while seventy-eight, or 49.36 percent indicated that pool scheduling is done by other people in the physical education department or university.

One aquatics director commented, "Our small sized classes make it unnecessary for a lifeguard to be present. The swimming instructor can do both jobs but we do require guards for all open swimming." Another aquatics director stated:

> We require a lifeguard to be on duty whenever there are more than 15 people in the pool. This discourages large classes because the college doesn't want to pay both an instructor and a lifeguard for classes that could be handled by one person. The only exception to this rule is varsity swimming.

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| Total Number of Responses | 158 | 100.00 |

Eighty, or 50.64 percent of the aquatics directors and swimming coaches surveyed indicated that the aquatics director is in charge of all swimming pool scheduling, while seventy-eight, or 49.36 percent indicated that pool scheduling is done by other people in the physical education department or university.

One aquatics director commented:

> We would be a lot better organized if the A.D. (athletic director) would let me handle all the pool scheduling; as it is now there is so much red tape and repetition that we are always stepping on each others toes and no one seems to know what's going on most of the time.

Table VII shows data concerning whether the college or university aquatics facility is utilized during the summer months by the AAU organization for the purpose of competitive swimming.

TABLE VII

AMATEUR ATHLETIC UNION COMPETITION
DURING THE SUMMER MONTHS

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, the facility is used by the AAU | 40 | 25.31 |
| NO, we do not allow use of the facility by the AAU | 118 | 74.69 |
| Total Number of Responses | 158 | 100.00 |

Forty, or 25.31 percent of the surveyed aquatics directors and swimming coaches indicated that their college or university permits use of the pool during the summer by the AAU, while one hundred eighteen, or 74.69 percent indicated that they did not.

One swimming coach commented, "We used to allow the AAU to use our pool in the summer but we discontinued the practice as our summer school enrollment increased." Another commented, "They (the AAU) use it all winter, too."

Table VIII indicates the percentage of colleges and universities surveyed who require physical education for graduation, and how many years physical education is required.

TABLE VIII

PHYSICAL EDUCATION REQUIREMENT AND YEARS REQUIRED

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, for one year | 55 | 34.81 |
| YES, for two years | 61 | 38.60 |
| YES, for three years | 9 | 05.69 |
| YES, for four years | 3 | 01.89 |
| Total YES Answers | 128 | 81.02 |
| NO, physical education is not required | 30 | 18.98 |
| Total Number of Responses | 158 | 100.00 |

One hundred twenty-eight of the aquatics directors and swimming coaches answering this question indicated that physical education was required at their institution. Fifty-five, or 34.81 percent of those aquatics directors and swimming coaches indicated that physical

education is required for one school year, while sixty-one, or 38.60 percent stated that physical education is required for two school years. Nine, or 5.69 percent of the respondents indicated that physical education is required for three years, and three, or 1.89 percent indicated that physical education is required for all four school years. Thirty, or 18.98 percent of the aquatics directors and swimming coaches surveyed indicated that physical education is not required at their institution.

An aquatics director commented, "Physical Education used to be required for graduation but the student senate voted out the requirement last year. It's really too bad." Another aquatics director stated, "P.E. is not mandatory but 99 percent take it any way." A swimming coach reported that "the P.E. requirement was voted out by the students, but we are trying to get it back in with our new facility."

In determining whether students are required to know how to swim in order to graduate from college the following data are reported in Table IX.

TABLE IX

SWIMMING REQUIREMENT FOR GRADUATION

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, must pass swimming test | 56 | 35.44 |
| NO, swimming test not required | 102 | 64.56 |
| Total Number of Responses | 158 | 100.00 |

Fifty-six, or 35.44 percent of the aquatics directors and swimming coaches reported that a swimming test is part of graduation requirements, while one hundred two, or 64.56 percent indicated that it is not required that students know how to swim in order to graduate.

One swimming coach stated, "We have tried to get this requirement through, but the ASB (Associated Student Body) always seems to block it." An aquatics director commented, "This is a good idea. It is too bad more people aren't aware how easy it is to learn to swim."

Table X indicates what percentage of colleges and universities surveyed require a swimming test as part of physical education majors professional preparation.

TABLE X

PHYSICAL EDUCATION MAJORS SWIMMING REQUIREMENT

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, a swimming test is required for physical education majors | 104 | 65.83 |
| NO, a swimming test is not required for physical education majors | 54 | 34.17 |
| Total Number of Responses | 158 | 100.00 |

One hundred four, or 65.83 percent of the aquatics directors and swimming coaches answering the question stated that a swimming test is required as part of professional preparation for all students majoring in physical education. Fifty-four, or 34.17 percent indicated that a swimming test is not required for physical education majors.

One aquatics director commented, "I shudder to think what would happen if we dropped our swimming requirement for majors. It is just as important to know how to swim as to know how to run." Another aquatics director stated, "All we require is for majors to pass beginning swimming, but most go on to take lifesaving and water safety instruction."

In determining who teaches in the basic instructional program, the following data are reported in Table XI.

TABLE XI

INSTRUCTOR OF THE INSTRUCTIONAL SWIMMING PROGRAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| Full-Time Instructors | 84 | 53.17 |
| Graduate Assistant Only | 0 | 00.00 |
| Combination of Full-Time Instructors and Graduate Assistants | 71 | 44.93 |
| Others | 3 | 01.89 |
| Total Number of Responses | 158 | 100.00 |

Eighty-four, or 53.17 percent of the aquatics directors and swimming coaches polled indicated their instructional swimming program is taught wholly by full-time faculty members. Seventy-one, or 44.93 percent indicated that the swimming instructional program at their college or university is taught by a combination of full-time faculty members and graduate assistants, while three, or 1.89 percent of those polled stated that part-time faculty are used to instruct in the swimming program in their institution.

Table XII presents the percentage, and type of jobs athletes and students on scholarship, and government work study programs perform in aquatics programs.

TABLE XII

DO ATHLETES OR OTHERS ON GOVERNMENT WORK STUDY OR OTHER FINANCIAL AID ASSIST IN THE AQUATICS PROGRAM?
IN WHAT CAPACITY?

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, they are used to help instruct | 24 | 15.19 |
| YES, they are used to help lifeguard | 106 | 67.09 |
| YES, they are used to help with maintenance | 79 | 50.00 |
| YES, they are used in various other capacities | 12 | 07.59 |
| Total YES in one or more capacities | 127 | 80.38 |
| NO, work study or scholarship students are not used in our aquatics program | 31 | 19.62 |

Thirty-one, or 19.62 percent of the college or university swimming coaches and aquatics directors indicated that they do not use government work study or other financial aid students to help with the aquatics program, while one hundred twenty-seven, or 80.38 percent of those polled stated that students on scholarship do assist in the aquatics program. In most cases where the government work study or other financial aid student is used to assist with the program, the aquatics directors and swimming coaches indicated that these students are used in more than one capacity, hence, because of repetitions, the figures tally more than one hundred percent. Twenty-four, or 15.19

percent indicate these students are used to help with instruction of classes. One hundred six, or 67.09 percent state that aided students are used in the capacity of lifeguard, while seventy-nine, or 50.00 percent of the responding aquatics directors and swimming coaches indicate that government work study or other financially aided students work in the area of maintenance. Twelve, or 7.59 percent state that these students work in capacities other than instructor, lifeguard, or maintenance. No explanation of such duties were reported.

Table XIII shows the percentage of the faculty associated with the aquatics program holding an American Red Cross water safety instructors certificate.

TABLE XIII

AMERICAN RED CROSS WATER SAFETY INSTRUCTOR'S CERTIFICATE

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, all aquatics faculty hold an ARC certificate or similar document | 129 | 81.65 |
| NO, all aquatics faculty do not hold an ARC certificate or similar document | 29 | 18.35 |
| Total Number of Responses | 158 | 100.00 |

One hundred twenty-nine, or 81.65 percent of all surveyed college and university aquatics directors and swimming coaches and related

aquatics faculty held an American Red Cross water safety instructor's certificate or similar document, while twenty-nine, or 18.35 percent of the aquatics faculty held no such document.

In determining the size of a typical swimming class, the question was asked of the aquatics directors and swimming coaches, "Approximately how many students compose a basic instruction swimming class?" The results are presented in Table XIV.

TABLE XIV

INSTRUCTIONAL SWIMMING CLASS SIZE

| Size of Class | Number Reporting | Percent of Reports |
|---|---|---|
| 0-9 students per class | 5 | 3.16 |
| 10-19 students per class | 42 | 26.58 |
| 20-29 students per class | 90 | 56.97 |
| 30-39 students per class | 11 | 6.96 |
| 40-49 students per class | 7 | 4.43 |
| More than 50 students per class | 3 | 1.89 |
| Total Number of Responses | 158 | 100.00 |

According to the 158 (100.00 percent) aquatics directors and swimming coaches responding to the question, the classes ranged in size from eight to fifty. The mean was determined to be 19.74 students per class.

Table XV indicates the number of institutions offering a course in swimming theory as part of the physical education curriculum and how many credit hours this course held.

TABLE XV

INSTITUTIONS OFFERING A COURSE IN THEORY OF SWIMMING

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we offer a theory of swimming course for one hour credit | 19 | 12.02 |
| YES, we offer a theory of swimming course for two hours credit | 40 | 25.31 |
| YES, we offer a theory of swimming course for three hours credit | 21 | 13.29 |
| Total of YES answers | 80 | 50.64 |
| NO, we do not offer a theory of swimming course | 78 | 49.37 |
| Total Number of Responses | 158 | 100.00 |

Eighty, or 50.64 percent of the aquatics directors and swimming coaches answering this question stated they do offer a course in the theory of swimming. Nineteen, or 12.02 percent stated the course carried one credit hour, forty, or 25.31 percent indicated the course carried two credit hours, and twenty-one, or 13.29 percent of the respondents indicated that the theory of swimming course carried three

hours of credit. Seventy-eight, or 49.37 percent of the aquatics directors and swimming coaches polled stated their institution offered no course in the theory of swimming.

Table XVI shows the percentage of institutions polled which offer a course in coaching and teaching of aquatic skills, and the number of credits such a course carries.

TABLE XVI

INSTITUTIONS OFFERING A COURSE IN COACHING AND TEACHING OF AQUATIC SKILLS

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we offer such a course for one credit hour | 20 | 18.32 |
| YES, we offer such a course for two credit hours | 51 | 46.78 |
| YES, we offer such a course for three credit hours | 28 | 25.68 |
| YES, we offer such a course for four credit hours | 10 | 9.17 |
| Total Number of YES Answers | 109 | 68.99 |
| NO, we do not offer such a course | 49 | 31.01 |
| Total Number of Responses | 158 | 100.00 |

One hundred nine, or 68.99 percent of the responding aquatics directors and swimming coaches indicated that their institution offered a course in coaching and teaching of aquatic skills. Twenty, or 12.65

percent indicated that this course carried one credit hour, while fifty-one, or 32.27 percent of those polled stated that the above course carried two hours of credit. Twenty-eight, or 17.72 percent indicated that a course in coaching and teaching aquatic skills has three hours of credit. Ten, or 6.33 percent stated that such a course was worth four hours credit. Forty-nine, or 31.01 percent of the respondents indicated that their institution offered no such course.

In determining the aquatics courses offered, and the credits allotted, the following data are presented in Table XVII.

TABLE XVII

AQUATIC COURSES OFFERED AND CREDITS ALLOTTED

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, beginning swimming | 155 | 98.11 |
| one-half credit hour | 41 | 26.46 |
| one credit hour | 80 | 51.62 |
| two credit hours | 23 | 14.84 |
| three credit hours | 0 | 0.00 |
| no credit given | 11 | 7.10 |
| NO, beginning swimming not offered | 3 | 1.89 |
| YES, intermediate swimming | 135 | 85.45 |
| one-half credit hour | 32 | 23.71 |
| one credit hour | 67 | 49.63 |
| two credit hours | 22 | 16.30 |
| three credit hours | 8 | 5.93 |
| no credit given | 6 | 4.45 |
| NO, intermediate swimming not offered | 23 | 14.55 |

TABLE XVII (Continued)

AQUATIC COURSES OFFERED AND CREDITS ALLOTTED

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, advanced swimming | 121 | 76.59 |
| one-half credit hour | 21 | 17.36 |
| one credit hour | 57 | 47.11 |
| two credit hours | 20 | 16.53 |
| three credit hours | 13 | 10.75 |
| no credit given | 10 | 8.27 |
| NO, advanced swimming not offered | 37 | 23.41 |
| YES, lifesaving | 119 | 75.32 |
| one-half credit hour | 8 | 6.73 |
| one credit hour | 35 | 29.42 |
| two credit hours | 34 | 28.58 |
| three credit hours | 29 | 24.37 |
| no credit given | 13 | 10.93 |
| NO, lifesaving not offered | 39 | 24.68 |
| YES, water safety instruction | 102 | 64.56 |
| one-half credit hour | 2 | 1.96 |
| one credit hour | 20 | 19.61 |
| two credit hours | 29 | 28.44 |
| three credit hours | 37 | 36.28 |
| no credit given | 14 | 13.73 |
| NO, water safety instruction not offered | 56 | 35.44 |
| YES, SCUBA diving | 61 | 38.61 |
| one-half credit hour | 0 | 0.00 |
| one credit hour | 4 | 6.56 |
| two credit hours | 12 | 19.68 |
| three credit hours | 35 | 57.38 |
| no credit hours | 10 | 16.40 |
| NO, SCUBA diving not offered | 97 | 61.39 |

TABLE XVII (Continued)

AQUATIC COURSES OFFERED AND CREDITS ALLOTTED

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, synchronized swimming | 44 | 27.85 |
| one-half credit hour | 1 | 2.28 |
| one credit hour | 4 | 9.09 |
| two credit hours | 24 | 54.55 |
| three credit hours | 9 | 20.46 |
| no credit given | 6 | 13.64 |
| NO, synchronized swimming not offered | 114 | 72.15 |
| YES, diving | 117 | 74.05 |
| one-half credit hour | 4 | 3.42 |
| one credit hour | 54 | 46.16 |
| two credit hours | 38 | 32.48 |
| three credit hours | 13 | 11.12 |
| no credit hours | 8 | 6.84 |
| NO, diving not offered | 41 | 25.95 |
| YES, water polo | 47 | 29.75 |
| one-half credit hour | 2 | 4.26 |
| one credit hour | 25 | 53.20 |
| two credit hours | 13 | 27.66 |
| three credit hours | 3 | 6.39 |
| no credit given | 4 | 8.51 |
| NO, water polo not offered | 111 | 70.25 |
| YES, water sports | 40 | 25.32 |
| one-half credit hour | 2 | 5.00 |
| one credit hour | 23 | 57.50 |
| two credit hours | 12 | 30.00 |
| three credit hours | 1 | 2.50 |
| no credit given | 2 | 5.00 |
| NO, water sports not offered | 118 | 74.68 |

One hundred fifty-five, or 98.11 percent of the aquatics directors and swimming coaches polled stated that their aquatics program included beginning swimming. The majority, eighty or 51.62 percent, indicated that beginning swimming carried one credit hour. One hundred thirty-five, or 85.45 percent of the respondents stated that their institution offered intermediate swimming as part of the aquatics program. The majority, sixty-seven or 49.63 percent, of those polled state that such a course is worth one credit hour. One hundred twenty-one, or 76.59 percent of the aquatics directors and swimming coaches reporting stated their institution offered an advanced swimming course. It was reported that such a course carries one credit hour in fifty-seven, or 47.11 percent of the institutions. One hundred nineteen, or 75.32 percent of the respondents stated that lifesaving is part of the aquatics curriculum at their institution. The aquatics directors and swimming coaches further stated that a lifesaving course, in a majority of the cases, carried either one or two credit hours. Thirty-five, or 29.42 percent indicated a lifesaving course carried one credit hour, while thirty-four, or 28.58 percent indicated the lifesaving course carries two credit hours. One hundred two, or 64.56 percent of those polled indicated their aquatics program offered a course in water safety instruction. This type of course varied in credit value generally from two credit hours to three credit hours. Twenty-nine or 28.44 percent of those polled indicated that a water safety instruction course is worth two credit hours, while, thirty-seven, or 36.28 percent indicated that this course carried three credit hours. Sixty-one or 38.61

percent of the responding aquatics directors and swimming coaches stated that their institution offered a course in SCUBA diving. The majority of those polled showed that a SCUBA diving course is allotted three credit hours (thirty-five, or 57.38 percent). Forty-four, or 27.85 of those polled indicated that synchronized swimming is a part of the aquatics curriculum. Most, twenty-four or 54.55 percent, of the responding aquatics directors and swimming coaches stated that synchronized swimming carried two credit hours. One hundred seventeen, or 74.05 percent of those polled indicated that their institution offered diving in their curriculum. Fifty-four, or 46.16 percent indicated that a diving course carried one credit hour. Forty-seven, or 29.75 percent of the responding aquatics directors and swimming coaches indicated water polo is included in the aquatics program. A majority, twenty-five or 53.20 percent, stated that a course in water polo is worth one credit hour. Forty, or 25.32 percent of the respondents stated that a course in water sports is offered. Most, twenty-three or 57.50 percent, indicated that a course in water sports is allotted one credit hour. In the discussion of the results shown in Table XVII, the percentages are based upon the number of "YES" answers to the questions asked.

Table XVIII shows the number and percentage of intramural programs offered in the institutions polled. In the discussion of the results shown in Table XVIII, the percentages are based upon the number of "YES" answers to the questions asked.

TABLE XVIII

INTRAMURAL PROGRAMS OFFERED

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, intramural program | 150 | 94.94 |
| Men's competitive swimming | 147 | 98.00 |
| Women's competitive swimming | 85 | 56.67 |
| Men's diving | 97 | 64.67 |
| Women's diving | 33 | 22.00 |
| Water polo | 86 | 57.34 |
| Synchronized swimming | 14 | 9.34 |
| Water basketball | 7 | 4.67 |
| NO, we have no intramural program | 8 | 5.06 |

One hundred fifty, or 94.94 percent of the aquatics directors and swimming coaches responding indicated they have an aquatics intramural program. One hundred forty-seven, or 98.00 percent state that men's competitive swimming is included in the intramural aquatics program. Eighty-five, or 56.67 percent indicated that women's competitive swimming is included in the program. Ninety-seven, or 64.67 percent of those polled showed that men's diving was a part of the intramural aquatics program, while thirty-three, or 22.00 percent indicated that women's diving is included. Eighty-six, or 57.34 percent of the respondents stated that water polo is part of the program and fourteen,

or 9.34 percent of those polled included synchronized swimming a part of the intramural aquatics program. Seven, or 4.67 percent indicated that their institution has water basketball included in the program. Eight, or 5.06 percent of the polled aquatics directors and swimming coaches stated that their institution has no intramural aquatics program.

In determining who sets up the intramural aquatics program the following question was asked to the selected aquatics directors and swimming coaches, "Who administers the intramural program?" The results are presented in Table XIX.

TABLE XIX

ADMINISTRATION OF INTRAMURAL PROGRAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| Intramural Director | 37 | 23.41 |
| Coaches of Various Sports | 20 | 12.65 |
| Combination of Intramural Directors and Coaches of Various Sports | 99 | 62.66 |
| Others | 2 | 1.26 |
| Total Number of Responses | 158 | 100.00 |

Thirty-seven, or 23.41 percent of those responding stated that the intramural program is administered by the intramural director only. Twenty, or 12.65 percent indicated the program is administered by the

coaches of the various sports involved. Ninety-nine, or 62.66 percent of the polled aquatics directors and swimming coaches stated that the intramural program is administered by a combination of the intramural director and coaches of the various sports involved. Two, or 1.26 percent indicated that their intramural program is set up and administered by "student scheduling."

Table XX shows the percentage of institutions polled who allow student use of the pool for recreational swimming.

TABLE XX

STUDENT USE OF POOL FOR RECREATIONAL SWIMMING

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, pool open to students | 154 | 97.47 |
| NO, pool not open to students | 4 | 2.53 |
| Total Number of Responses | 158 | 100.00 |

One hundred fifty-four, or 97.47 percent of the aquatics directors and swimming coaches responding to this question stated that the swimming pool is open to students for recreational swimming while four, or 2.53 percent indicated the pool is not open to students for recreational swimming.

One aquatics director commented:

> We have the pool open for three hours every night seven days a week for recreational swimming. Some nights we may only have 10 to 15 kids, but we always keep it open. It is our feeling here at the university that swimming and physical education are for all students; therefore, they should be able to use the facilities whenever possible. This policy has established good rapport among physical education faculty and students.

In determining whether institutions allowed faculty use of the pool, the following data are presented in Table XXI.

TABLE XXI

FACULTY USE OF POOL

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, pool open to faculty members | 153 | 96.84 |
| NO, pool not open to faculty members | 5 | 3.16 |
| Total Number of Responses | 158 | 100.00 |

One hundred fifty-three, or 96.84 percent of the respondents indicated that their pool was open to use by the faculty while five, or 3.16 percent of polled aquatics directors and swimming coaches stated they did not allow use of the pool by the faculty.

There were many comments on this question. The one the writer believes intimates the feelings of the aquatics directors and swimming coaches on this question came from an aquatics director at a Big Ten University.

He commented:

> We allow the faculty to use the P.E. pool from 11:30 (A.M.) to 1:00 (P.M.) five days a week and on Saturday and Sunday afternoon for their families. In this day and age when athletics and physical education are coming under such severe criticism, we felt that by allowing faculty members to use the facility (swimming can be enjoyed by more faculty than any other physical activity) we could show some of the dissidents that our department is interested in more than winning and spending money. So we asked the faculty when they wanted to use the pool and they replied "over the lunch hour", so we scheduled our classes around this time. The results have been remarkable.

In determining whether campus affiliated organizations were allowed to use the university aquatics facility, the following data are presented in Table XXII.

TABLE XXII

POOL USE BY CAMPUS ORGANIZATIONS

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we permit use of pool by campus organizations | 140 | 88.61 |
| NO, we do not permit use of pool by campus organizations | 18 | 11.39 |
| Total Number of Responses | 158 | 100.00 |

One hundred forty, or 88.61 percent of the respondents stated that the pool at their institution is available for use by campus affiliated organizations. The rental cost per hour of the pool ranged from no charge to $25.00 per hour. The average cost per hour is

$3.88. Most aquatics directors and swimming coaches felt that the physical education department should furnish the lifeguards and that the campus groups were responsible for paying the lifeguards. Eighteen, or 11.39 percent of those polled indicated that the pool is not available for use by campus organizations.

Table XXIII shows the percentage of colleges and universities who allow use of their aquatics facility by outside organizations.

TABLE XXIII

POOL USE BY OUTSIDE ORGANIZATIONS

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we permit use of pool by outside organizations | 103 | 65.19 |
| NO, we do not permit use of pool by outside organizations | 55 | 34.81 |
| Total Number of Responses | 158 | 100.00 |

One hundred three, or 65.19 percent of the aquatics directors and swimming coaches indicated that their aquatics facility is available for use by outside organizations. The cost per hour for this service ranged from no charge to as high as $80.00. The mean cost is $16.12 per hour. The respondents indicated that the physical education department should furnish all lifeguards and that the organization is responsible for paying the guards.

One swimming coach commented, "This is a h--- of a way to build community relations. I am trying to get the cost lowered at the present time." Another stated, "We charge different fees for different types of groups. The Boy Scouts, etc. receive cheaper rates than organizations such as the high school Spanish Club."

In determining how many institutions engaged in intercollegiate swimming and diving competition, the following data are reported in Table XXIV.

TABLE XXIV

MEN'S INTERCOLLEGIATE SWIMMING TEAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we have an intercollegiate swimming team | 149 | 94.31 |
| NO, we do not have an intercollegiate swimming team | 9 | 5.69 |
| Total Number of Responses | 158 | 100.00 |

One hundred forty-nine, or 94.31 percent of those answering this question stated that their institution has an intercollegiate swimming team while nine, or 5.69 percent of the respondents indicated that their institution does not sponsor such a team.

Table XXV indicates the percentage of institutions which have an organized water polo team.

TABLE XXV

ORGANIZED WATER POLO TEAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we have an organized water polo team | 101 | 63.93 |
| NO, we do not have a water polo team | 57 | 36.07 |
| Total Number of Responses | 158 | 100.00 |

One hundred one, or 63.93 percent of the aquatics directors and swimming coaches stated that they were associated with an institution which has an organized water polo team. Fifty-seven, or 36.07 percent indicated their institution has no such program.

One swimming coach commented, "I believe that water polo is the best pre-season conditioning sport there is for swimming; therefore, all my varsity swimmers play water polo in the early fall." Another stated, "Water polo is organized on our campus as a club activity under the direction of the coach and the intramural director."

In determining whether women's competitive swimming is a part of the aquatics program, the following data are presented in Table XXVI.

TABLE XXVI

WOMEN'S SWIMMING TEAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we have a women's swimming team | 61 | 38.60 |
| NO, we do not have a women's swimming team | 93 | 58.86 |
| Total Number of Responses | 154 | 97.47 |
| Did not answer question | 4 | 2.53 |

Sixty-one, or 38.60 percent of the reporting aquatics directors and swimming coaches stated that their institution has an organized women's swimming team, while ninety-three, or 58.86 percent indicated that they did not have a program. Four of those polled chose not to answer.

An aquatics director commented, "We have the interest among the girls for such a program but we can find no one with the time who is qualified to coach." Another commented, "Our girls would like to have a swimming team, but at present we have no funds for travel to other schools for meets."

Table XXVII presents the percentage of institutions offering aquatics scholarships and the areas in which they are offered.

TABLE XVII

AQUATIC SCHOLARSHIPS

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we offer scholarships | 115 | 72.79 |
| Competitive swimming | 115 | 100.00 |
| Competitive diving | 97 | 84.35 |
| Water polo | 58 | 50.44 |
| Women's aquatics | 4 | 3.48 |
| NO, we do not offer scholarships | 43 | 27.21 |
| Total Number of Responses | 158 | 100.00 |

One hundred fifteen, or 72.79 percent of the institutions polled indicated that they awarded scholarships in aquatics. Of these who offer scholarships, one hundred fifteen, or 100.00 percent of the respondents offer such scholarships for outstanding ability in competitive swimming, while ninety-seven, or 84.35 percent offer scholarships in the area of competitive diving. Fifty-eight, or 50.44 percent of the aquatics directors and swimming coaches polled stated their institution offered scholarships in water polo. Four, or 3.48 percent indicated that scholarships were available for women's aquatics. Forty-three, or 27.21 percent of those answering the question stated that their institution does not offer scholarships in the aquatics area.

In determining how many of the polled institutions have a separate equipment room for the aquatics program the following data are presented in Table XXVIII.

TABLE XXVIII

SEPARATE EQUIPMENT ROOM
FOR AQUATICS PROGRAM

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we have a separate equipment room | 95 | 60.13 |
| NO, we do not have a separate equipment room | 63 | 39.87 |
| Total Number of Responses | 158 | 100.00 |

Ninety-five, or 60.13 percent of the aquatics directors and swimming coaches responding to this question stated that in their institution the aquatics facility had a separate equipment room, while sixty-three, or 39.87 percent indicated they do not.

An aquatics director stated, "We have found that we are unable to get along without an equipment room of our own. Before we had to chase all over the building to find what we needed but now everything is centrally located at the pool." A swimming coach commented, "I asked the athletic director if an enclosure couldn't be built in the pool area to house kickboards, ropes, etc. and he replied 'you have room in your office for all that,' so you know what I'm up against."

Another comment was "we really do need a room of our own especially when the main equipment room closes at 5:00 p.m."

Table XXIX shows the percentage of institutions who employ a maintenance man whose main duty it is to take care of the pool.

TABLE XXIX

AQUATICS MAINTENANCE MAN

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we employ a man whose main duty is aquatics maintenance | 105 | 66.46 |
| NO, we employ no such person | 51 | 32.27 |
| Total Number of Responses | 156 | 98.74 |
| Did not answer question | 2 | 1.26 |

One hundred five, or 66.46 percent of the respondents stated that their institution employed a man whose main duty is pool maintenance while fifty-one, or 32.27 percent of those polled indicated that they do not employ such a person. Two respondents did not answer the question.

One swimming coach stated, "Our operation at present is not large enough to employ a person expressly for this purpose. I don't believe it is really necessary if your maintenance people take pride in the facility."

In determining how many people have a hand in handling chemical and filtering operations in an aquatics facility, the following data are reported in Table XXX.

TABLE XXX

CHEMICAL AND FILTERING MAINTENANCE

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, chemical and filtering operations are handled by one person | 118 | 74.69 |
| NO, several share the responsibility | 38 | 24.05 |
| Total Number of Responses | 156 | 98.74 |
| Did not answer question | 2 | 1.26 |

One hundred eighteen, or 74.69 percent of the aquatics directors and swimming coaches polled stated that in their facility the chemical and filtering operations were handled by one man. Thirty-eight, or 24.05 percent of the respondents indicated that several shared the responsibility. Two persons did not answer the question.

An aquatics director commented, "I think this is a very important part of the operation. One person alone can be aware of what has been done and what remains to be done while more than one risk duplicating procedures that may result in dangers for the swimmers."

Another stated, "We at the university think that several can share this responsibility only if they are required to keep a daily comprehensive log book on what has been done today, and what remains to be done; our janitors have done a good job so far."

Table XXXI indicated the material from which the pools involved in this study are constructed.

TABLE XXXI

CONSTRUCTION OF POOL

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| Concrete | 18 | 11.39 |
| Concrete and Tile | 135 | 85.45 |
| Aluminum | 0 | 0.00 |
| Gunite | 3 | 1.91 |
| Total Number of Responses | 156 | 98.74 |
| Did not answer question | 2 | 1.26 |

Eighteen, or 11.39 percent of the institutions answering this question stated that their pool is constructed of concrete only, while one hundred thirty-five, or 85.45 percent indicated that the pool at their institution is constructed of concrete and tile. No reports indicated the use of aluminum for pool construction, though this

method of construction is increasing in popularity. Three, or 1.91 percent stated their pool is constructed of gunite, a sprayed on concrete applied pneumatically.[1] Two subjects did not answer the question.

In determining if institutions had define teaching stations for the instruction of classes, the following data are reported in Table XXXII.

TABLE XXXII

AQUATICS TEACHING STATIONS

| Statement | Number Reporting | Percent of Reports |
|---|---|---|
| YES, we have defined teaching stations | 97 | 61.40 |
| NO, we do not utilize | 36 | 22.78 |
| Total Number of Responses | 133 | 84.18 |
| Did not answer question | 25 | 15.82 |

Ninety-seven, or 61.40 percent of the aquatics directors and swimming coaches polled stated that they do utilize defined teaching stations, while thirty-six, or 22.78 percent of the respondents stated that they do not use teaching stations. Twenty-five of the persons

[1] CNCA, Swimming Pools, A Guide to Their Planning, Design and Operation, p. 12.

method of construction is increasing in popularity. Three, or 1.91 percent stated their pool is constructed of gunite, a sprayed on concrete applied pneumatically.[1] Two subjects did not answer the question.

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[1] CNCA, Swimming Pools, A Guide to Their Planning, Design and Operation, p. 12.

polled chose not to answer this question. The investigator is unable to justify this action.

One swimming coach stated, "We don't use defined teaching stations per se. We allow flexibility in our teaching stations. I've found this method gives better results."

It should be noted that the results and implications of this survey will be incorporated in the aquatics handbook for South Dakota State University which appears in Chapter VI.

# CHAPTER V

## SUMMARY OF FINDINGS, IMPLICATIONS, AND RECOMMENDATIONS

### The Problem

The purpose of this study was to determine the status of aquatics programs of selected universities and colleges and to develop for South Dakota State University a handbook comprehensively covering the facets of an excellent aquatics program to be used in conjunction with the yet-to-be completed University Natatorium.

### Source of Data

Subjects who participated in this study were aquatics directors and swimming coaches of colleges and universities the approximate size of South Dakota State University in all fifty states. The data on the questionnaire were tabulated and the information was placed in table form, revealing the number of answering respondents and the percentage of those reports as it pertains to the total reporting population. The results of each table and the explanation of these results were discussed following each table. The detailed presentation of the data appears previously in Chapter IV.

### Summary of the Findings, Implications, and Conclusion

1. The data reveal a majority of colleges and universities polled do not have an aquatics handbook available to staff and employees concerning pool operation and maintenance. Many of the subjects indicated that a handbook should be made available and their institutions were working on one at the present time.

2. The data reveal that in the colleges and universities polled there is about an equal percentage of schools who employ a full-time aquatics director to those in which several faculty members share the responsibility of administering the aquatics program.

3. A substantial percentage (69.62) of the institutions polled indicated they do not carry liability insurance specifically covering the aquatics program.

4. The data indicated that most colleges and universities do not hire graduate assistants specifically to help with the aquatics program.

5. A substantial percentage (69.62) of those polled state that their institution does not require a lifeguard to be on duty at all times when the pool is open.

6. The data reveal that there is near even division in the number of institutions in which the aquatics director is in charge of all pool scheduling as opposed to several persons scheduling pool usage.

7. The data indicated that physical education is required in the majority of institutions polled, usually for one or two years.

8. A majority of the institutions polled (74.69) indicated their pool is not available for use by the Amateur Athletic Union.

9. The data reveal that most institutions (64.56) do not require the student to pass a swimming test in order to graduate.

10. Most institutions polled (65.83 percent) require the physical education majors to pass a swimming test as part of their preparation.

11. Aquatics directors and swimming coaches responding to the questionnaire indicated that in their institution the aquatics classes are taught by full-time instructors in the majority (53.17 percent) of the cases.

12. The data indicated that colleges and universities use financially aided students and athletes to assist with the aquatics program in various capacities.

13. The data revealed that a majority (81.65 percent) of the faculty associated with aquatics hold an American Red Cross water safety instructor's certificate.

14. The data revealed that the average size of a swimming class in the institutions polled was 19.74 students.

15. The data indicated that of the colleges and universities polled one-half (50.64 percent) offer a course in the theory of swimming.

16. The majority of the institutions responding to the questionnaire indicated they offered a course in coaching and teaching of aquatics skills (68.99 percent). Forty-six and 78/100 percent stated that this course carried two credit hours.

17. The data revealed that a majority of the institutions polled offered beginning swimming, (98.11 percent), intermediate swimming (85.45 percent), advanced swimming (76.59 percent), lifesaving (75.32 percent), water safety instruction (64.56 percent), diving (74.05 percent). A minority of the institutions polled offered courses in water polo (29.75 percent), water sports (25.32 percent), SCUBA diving (38.61 percent) and synchronized swimming (27.85 percent).

18. The data indicated that almost all of the institutions polled (94.94 percent) had an intramural aquatics program. Most schools offered men's competitive swimming, women's competitive swimming, men's diving, and water polo.

19. The data indicated that the intramural program in 62.66 percent of the cases is administered by a combination of the intramural director and the coaches of the sports involved.

20. The data indicated that the pool is open to students for recreational swimming in 97.47 percent of the institutions polled.

21. The data revealed that the pool is open to faculty members for recreational swimming in 96.84 percent of the colleges and universities responding to the questionnaire.

22. The data indicated that in a majority of cases, (88.61 percent), the pool was available to campus affiliated organizations but a rental charge ranging from no charge to $25.00 per hour was assessed.

23. A majority of the institutions polled, (65.19 percent), indicated that their pool was available for use by outside organizations. A rental fee ranging from no charge to $80.00 per hour was assessed.

24. The data indicated that 94.31 percent of the institutions polled had an intercollegiate swimming team.

25. The data revealed that 63.93 percent of the colleges and universities polled indicated they had an organized water polo team.

26. A majority of those polled, (58.86 percent), stated their institution did not have a women's swimming team.

27. The data indicated that 72.79 percent of the institutions responding to the questionnaire offered scholarships for aquatics skill.

28. The data revealed that most of the colleges and institutions polled, (60.13 percent), had a separate equipment room for the storage of aquatics equipment.

29. A majority of the swimming coaches and aquatics directors, (66.46 percent), stated that their institution employed a maintenance man whose main duty was pool maintenance.

30. The data revealed that 74.69 percent of the institutions polled had their chemical and filtering operations handled by one person.

31. Most of the institutions responding to the questionnaire, (85.45 percent), stated that their pool was constructed from concrete and tile.

32. The data indicated that 61.40 percent of the colleges and universities have defined teaching stations for the instruction of aquatics classes.

The above findings, implications and conclusions are incorporated in the manual for Pool Operation at South Dakota State University and appear in the following chapter.

## Recommendation for Further Research

Specific studies should be carried out in separate areas of pool maintenance, staffing, programming, and administration.

# CHAPTER VI

# AN AQUATICS HANDBOOK

## Introduction

Based upon the review of literature, data obtained from a survey of selected collegiate aquatics directors and swimming coaches, and the investigator's personal experience with aquatic facilities and programs, the following handbook was devised for the projected South Dakota State University Natatorium. The Natatorium will be in operation by September, 1972. The investigator urges that the handbook be revised where necessary should changes occur in the projected construction of the aquatics facility.

This manual was prepared primarily discussing and listing the duties and responsibilities of those individuals involved in the aquatics program. No attempt was made to discuss or list the personal or professional qualifications of full-time faculty members involved in the program. It is realized that background, knowledge, professional desire and experience are necessary qualifications which full-time aquatics faculty should possess.

# SECTION 1

## DUTIES AND RESPONSIBILITIES OF AQUATICS STAFF

### Section 1.1: Aquatics Director

The aquatics director is responsible for the complete operation and administration of the aquatics complex. He will work cooperatively with the Head of Health, Physical Education and Recreation Department in all phases of the total aquatics program. In the execution of his duties, the aquatics director should carry out the following specific functions:

1. Supervise pool plant and all related facilities.
2. Assist in recruitment, selection and assignment of all pool personnel.
3. Plan and organize a comprehensive program of classes and activities for the pool and schedule the use of the pool.
4. Develop and conduct in-service training programs for the staff assigned to the pool and establish emergency standard operating procedure.
5. Handle all grievances of aquatics staff members.
6. Evaluate performance of all aquatics staff members.
7. Assist in the preparation, distribution, and enforcement of rules and regulations of the pool.
8. Handle all grievances and/or discipline cases involving pool users.
9. Keep pool usage records, maintenance, and other administrative matters as set forth by his superiors.
10. Prepare a semi-annual (semester) report of the pool's operation.
11. Supervise the collection and banking of all receipts taken in by use of the aquatics facility.

12. Keep an up-to-date inventory of all equipment and supplies.

13. Prepare requisitions for procurement of supplies and equipment for the pool.

14. Prepare public relations material for news stories, radio announcements, brochures and other publicity items.

15. Assure the maximum safety of pool users.

16. Be prepared to coordinate and assist with any phase of the pool's operation not outlined above that may be required.

17. Prepare reports on needed repairs for the proper authority.

Section 1.2: Swimming Coach

The collegiate swimming coach is a highly specialized individual and his main duty is to coach intercollegiate swimming. As a member of the university faculty, his duties and responsibilities are:

1. Assist in the preparation, distribution, and enforcement of all rules and regulations of the pool.

2. Keep an up-to-date inventory on all equipment and supplies in the competitive swimming area.

3. Handle athletic administrative matters as set forth by superiors.

4. Prepare requisitions for procurement of competitive equipment and supplies for the pool.

5. Prepare public relations material for news stories, radio and television announcements, brochures and other publicity items as they relate to intercollegiate swimming.

6. Assure maximum safety of pool patrons.

7. Be prepared to assist the aquatics director in any phase of the aquatics operation not outlined above that may be required.

8. Cooperatively arrange swimming schedule and administer intercollegiate swimming program with the aquatics director.

Section 1.3: Instructor

As an instructor in aquatics, certain duties and responsibilities must be adhered to. They are:

1. Assure maximum safety of the pool users.
2. Constantly be on the lookout, when teaching for accidents occurring in the water, on the deck or on the diving equipment.
3. The responsibility to instruct fully and knowledgeably in all areas of aquatic safety before proceeding in the water.
4. The responsibility to be punctual at every class meeting.
5. Maintain order in the pool and as far as possible, foresee possible trouble and take steps to prevent it.
6. Enforce and adhere to all rules and regulations of the pool.
7. Report any definite or potential hazards and unsafe conditions to the aquatics director.
8. Maintain an acceptable appearance at all times as to both teaching uniform and personal hygiene.
9. Keep an up-to-date inventory of all instructional supplies and equipment.
10. Prepare requisitions for procurement of instructional supplies and equipment.
11. Be prepared to assist the aquatics director in any phase of the pool's operation not outlined above that might be required.
12. Have a thorough knowledge of all first aid equipment and how to use it.

The success as an aquatics instructor will be measured in terms of the changes effected in the students. How well the students swim

is only one measure of teaching success. To teach a student to swim without attempting to build positive attitudes toward being safe is in the same category as teaching a person to drive an automobile with little regard for the rules of the road. The task of teaching will not be complete unless the students become aware of the causes of accidents around a swimming area and how these accidents can be prevented. Further, and more important, the instructor must be able to develop within the students a desire to be safe at all times. This phase of teaching may be more difficult than the teaching of skills. The teaching approach and the example set will do much to develop the desire for safety procedures.

As an instructor in aquatics your credential, such as the American Red Cross Water Safety Instructor's Certificate and American Red Cross Standard First Aid Card must be current. Approximately at semester intervals, the instructor may be required to attend reviews and retraining sessions to update qualifications.

## Section 1.4: Head Lifeguard

The head lifeguard should be a graduate assistant, graduate student, or knowledgeable experienced senior student. His duties are:

1. Supervise the student lifeguards. This includes such things as their attentiveness in their job, reporting to work on time, and their dealings with the people using the pool.
2. See that pool rules and regulations are followed.

3. Make sure the pool is in an orderly appearance at the conclusion of the swimming session. This includes lane markers, kickboards, balls, fins, bricks, ring buoys, rescue poles, etc. to be put in their proper places.

4. To see that the pool is locked when he leaves (remember there are four doors).

5. Assist in the evaluation of lower staff members.

6. Handle minor grievances and/or discipline cases involving pool users.

7. Assist in the opening of the pool.

8. Assure the maximum safety of pool patrons.

9. Notify aquatics director immediately of needed repairs.

10. Be loyal to his superiors.

11. Remember you are a lifeguard. The above duties are in addition to the duties you hold as a guard.

12. Be prepared to assist the aquatics director in any phase of the pools operation not outlined above that may be required.

When in charge of the supervision of the pool, it is preferred that the head lifeguard spend time close to the pool area. If it is necessary to be somewhere else, he must inform the lifeguards as to where he can be contacted. He must never leave the building while recreational swimming is in session. Swimming during the recreational session is permissible as long as the responsibilities are being carried out effectively.

Section 1.5: Lifeguard

The major responsibility of a lifeguard is to protect the life and well-being of each person using the aquatics facility. He is selected from available applicants on the basis of his ability to do

the lifeguarding job with a high level of proficiency. The factors included in selection are: experience, qualifications, maturity, references, major interest or study area, study load, appearance, and availability.

Lifeguards are to be scheduled for work at times that do not conflict with other activities as outlined in his application for employment. It is expected that he will report punctually for duty. It is necessary, therefore, that he be in the building at least fifteen minutes prior to the scheduled start of duty, to perform preliminary duties such as changing clothes, showering and checking the facility.

If unable to work, the lifeguard must notify the aquatics director at least twenty-four hours before scheduled duty so that a substitute may be found. Only in the case of an emergency may the lifeguard make his own substitution. The aquatics director will have a list of qualified substitutes. The lifeguard will be held responsible for scheduled work time unless prior notice is given to the aquatics director.

Before employment is confirmed, documentary proof of qualifications, (American Red Cross Water Safety Instructor Certificate) should be examined by the aquatics director. From time to time, at approximately semester intervals, the lifeguard may be required to attend review and retraining sessions to update qualifications.

The qualities of a good lifeguard are:

1. Be a strong swimmer and possess an American Red Cross Water Safety Instructor's Certificate or its equivalent. Preferably an American Red Cross First Aid Card as well.

2. Be loyal to your employer and the confidence placed in him to do a responsible job.

3. Be willing to enforce all pool rules.

4. Have a good physical appearance.

5. Be alert and have a keen sense of anticipation.

6. Be polite and courteous, but strict, in enforcing pool rules and regulations.

7. Have a knowledge of all pool rules and procedures.

8. Be anxious to improve your ability and knowledge.

9. Maintain a high level of physical fitness to cope with the unusual demands that may be placed on your physical, mental, and emotional condition.

As a lifeguard, the following duties under the direction and supervision of the head lifeguard and aquatics director will be performed:

1. Prevent accidents through the enforcement of policies, rules, regulations, and ordinances governing the conduct of persons using the aquatics facility.

2. Constantly be on the lookout, when on duty, for accidents occurring in the water.

3. Enter water to rescue persons in trouble; resuscitate swimmers who need it; administer first aid to the injured and call the emergency room at hospital on serious accident cases.

4. Maintain order in the pool, and as far as possible, foresee possible trouble and take steps to prevent it.

5. Enforce and adhere to all rules and regulations of the pool.

6. Call head lifeguard and/or aquatics director if assistance in maintaining discipline of swimmers is needed.

7. Be friendly, helpful, and cheerful to all pool users and fellow employees in the performance of your duties.

8. Assist as needed in any area of the pool when requested by the head lifeguard or aquatics director.

9. Report definite or potential hazards and unsafe conditions to the head lifeguard and aquatics director.

10. Assure maximum safety of all pool users.

11. Maintain an acceptable appearance at all times as to both uniform and personal hygiene.

12. Do not allow all four diving boards to be in service at one time.

13. Regulate the pool for a majority of those present, not for a small minority.

14. Do not allow general swimming in the diving area.

15. Do not talk excessively to other guards or to swimmers while on duty.

16. When guarding during class sessions you are under the direction of the instructor and should follow all directions given.

17. Do not allow any person with street clothes in the pool area.

As a lifeguard, it is permissible to take a five minute break to leave the pool deck if the pool can be supervised properly. The other lifeguards must be notified of this action. The lifeguard may take a short swim if the pool is not crowded and there are a sufficient number of lifeguards on duty. Notify the other guards so they can cover the vacant guard position.

## Section 1.6: Maintenance Personnel

In all probability, the job of maintenance is the most important single item in the aquatics field. As a maintenance engineer, it will be required to keep the aquatics facility sanitary and safe

at all times. Section 2 and 3 of this handbook deal with chemical and filtering operations, prime duties of the maintenance engineer.

The following duties of maintenance personnel are:

1. Assure maximum safety of the pool users at all times.
2. Assure absolute sanitary cleanliness.
3. Develop and conduct in-service training programs for all maintenance personnel.
4. Keep detailed daily records as set forth by the aquatics director.
5. Prepare a semi-annual (semester) report on the pool's maintenance operation.
6. Keep an up-to-date inventory of all maintenance equipment and supplies.
7. Prepare requisitions for procurement of maintenance supplies and equipment for the aquatics program.
8. Assist in opening and closing the pool.
9. Be prepared to assist the aquatics director in any phase of the pool's operation not outlined above that might be required.
10. Check filter twice daily, backwash and clean when necessary.
11. Check pH of pool at three hour intervals daily and adjust accordingly.
12. Vacuum pool bottom and wall daily.
13. Swab and disinfect pool deck daily.
14. Keep a log book of all chemical and filtering operations so if someone has to fill in one day necessary adjustments will be on record.
15. Inspect daily, pool's water, equipment and supporting facilities.
16. Maintain a pool temperature of $76^{o}$ to $80^{o}$ F.

17. Maintain a pH reading of 7.2 to 7.6.

18. Maintain a free chlorine residual of .6 to 1.0 ppm.

A daily maintenance routine will be far more efficient and sanitary than trying to do each of the above when convenient. It must be remembered that it is easier to do a little all the time than to try to do a lot all at once.

# SECTION 2

## CONTROL OF pH, CHLORINE, BACTERIA AND ALGAE

This section is included for use by all maintenance personnel. It briefly outlines the coagulant chemistry that is necessary to keep an aquatics facility safe, sanitary and bacteria and algae free. It should be noted that pool chemistry is interrelated and the entire section should be read in order to get information concerning specific problems.

### Section 2.1: Algae

Algae are small plants that grow in swimming pool water. Even though algae may not be visible, it may be present in sufficient quantities to raise the pH because of the algae's use of the dissolved carbon dioxide in the water. Whenever conditions are unfavorable to their growth, they dry up in spores and the air carries them away. The air contains millions of algae spores ready to infect the pool. It is impossible to filter all algae from pool water.

Algae can grow sufficiently in as little as three days and turn the pool to a greenish color. Algae affected water may be clear at one time and turn green in as little as two hours. This is called algae bloom.

A little known fact is that ammonia nitrogen in the water acts as a nutrient for the growth of algae. There are many thousands of species of algae, each species having its own particular resistance to

various algaecides, making the production of a 100 percent effective algaecide almost impossible. Chlorine and hypochlorites, however, are probably the best overall algaecides.

Copper sulphate, otherwise known as Blue Vitrol or Blue Stone, is an old standard algaecide which has been used for many years. There are also new organic copper algaecides available on the market. It must be noted that copper cannot be used in aluminum pools.

Green algae, or the green moss types, are relatively easy to kill. The blue-green (black) algae appear in many cases as black dollar-sized spots, or many speckles on the pool wall or floor, often causing stains. They are much more resistant to the common algaecides.

It is now conceded that most algae require much higher concentrations of available chlorine than do bacteria for the same degree of kill. Algae are not so sensitive as bacteria to the portion of the available chlorine which is present as hypochlorous acid.

After algae are killed, the area should be brushed with a stainless steel algae brush. If the stain remains, dead algae may be removed by lowering the pool level below the affected area and using concentrated muriatic acid on the stained area for stain removal.

Algaecides, other than hypochlorites, gas chlorine, and bromine are not disinfectants. The ammonia compounds and copper sulphate, in the concentrations which they are used as algaecides, have little or no disinfecting qualities.

In general, a complete kill of algae, even in highly contaminated waters, can be effected in 24 to 48 hours. In cases where highly

resistant algae is growing in, and protected by, rough surfaces of the pool, the practice of superchlorination is about the only really effective method in killing algae.

Removing algae growth by superchlorination is accomplished very easily by applying a dosage of one ounce tablet chlorine for every 500 gallons of water. This application should be applied preferably in the evening after the pool is closed. After overnight treatment, the pool walls should be brushed to loosen the dead algae and the pool vacuumed. Before the pool is used again, the chlorine residual should be checked to make sure it is not too high. If it is higher than desired, it can be dropped to the desired range by adding fresh water. A maintenance engineer who checks the pH consistently and carefully would actually know that algae were present by this indication.

The practice of chlorination must be continued during days when the pool is not in use because hypochlorite is both an algaecide and a disinfectant.

## Section 2.2: Bacteria

Unless constantly sanitized, swimming pool water will carry many pathogenic bacteria and fungi. Pool water could be the carrier of diseases from one person to another, such as infections of the eye, ear, nose, and throat, or skin infections such as ringworm.

It is very important that a free residual available chlorine in sufficient quantities be available in swimming pool water at all times to prevent the transmission of bacteria by means of a "bacteria cloud." Bacteria cloud is defined as nose and throat mucous.

Bacteria in this form can readily be transmitted if the available chlorine is not free and available to kill bacteria rapidly enough to provide a reasonably bacteria free pool.

The most significant source of common pathogenic bacteria is that formed from human waste. These organisms may survive for weeks at temperatures near 70° F. or for months at lower temperatures.

Disease-producing organisms that are readily controlled or killed by a free residual chlorine are: Vegetative intestinal bacteria such as Salmonella, Shigella, Intestinal Protozoa, or in other words, endamoeba histolytica and histoplasma capsulatum; blood flukes; and viruses such as coxsackle, hepatitus, and poliomyelitus.

The bactericidal properties of chlorine have been recognized for many, many years. The utilization of this property has placed chlorine in an unrivaled position as a disinfectant agent throughout the world. The bactericidal action of chlorine is inherently and inseparately tied to its chemical characteristics and reaction with water.

When chlorine and hypochlorites are dissolved in water, they react to form hypochlorous acid and hydrochloric acid. The hypochlorous acid ionizes practically immediately into hydrogen and the hypochlorite ion. Such action is the basis for the use of chlorine and hypochlorite in water sanitation applications.

Hypochlorous acid is what actually kills microbial organisms in the water. The outstanding bactericidal property of hypochlorous acid is attributed to its ability to diffuse through cell walls and,

thereby, reach the vital parts of the bacteria cell. It is generally accepted that the death of the bacteria cell results from the reaction of hypochlorous acid with the enzyme, triosephosphoric dehydrogenase.

Section 2.3: Colored Water

Colored water is generally caused by the presence of metals such as iron, copper, and manganese in the water. They can be present either as metallic ions in solution or as finely divided particles of metallic compounds in suspension. Prompt measures should be taken to eliminate colored water when it occurs.

Each metal imparts its own characteristic color to pool water. Iron produces a red or reddish-brown tint; copper causes water to appear blue-green; and when manganese is present, the pool water takes on a brownish-black hue.

These metals get into the pool system in two ways. Usually, they are already dissolved in the water supply and fed to the pool. However, the pool water may pick up metals from piping and pool accessories used in the pool system. Maintaining the pool water at a pH of 7.0 or higher will minimize the metal pick-up from piping and accessories.

Pool chlorination causes an oxidation to take place which forms colored compounds with the metals present in the water. During normal pool usage, the formation of these compounds is often unavoidable. Ordinary filtration methods will not remove these colored compounds.

The following general color removal treatment is suggested:

1. Adjust the pH of the pool water to a range of 7.2 to 7.6.

2. Spread aluminum sulphate (alum) over the surface of the water at the rate of two ounces per 1,000 gallons of water. Allow time for the snowflake like floc that forms to settle out, and then remove it from the pool sides and bottom by vacuuming.

3. Again raise the pH of the pool water to the proper swimming range of 7.2 to 7.6.

4. Add chlorine as required to adjust the free chlorine residual to the desired range of 0.6 to 1.0 parts per million (ppm).

Section 2.4: Hard Water

Swimming pool water is considered hard when it contains dissolved solids in amounts which are detrimental to swimming pool equipment and bathers.

All waters contain a certain amount of dissolved solids. The quantity of dissolved solids in pool water is increased by the addition of chemicals used for various purposes thereby increasing the total alkalinity of the water. It is important that alkalinity be kept to an absolute minimum through proper pH control.

Calcium, magnesium, iron, and manganese are the chemicals in water with which we are primarily concerned. These solids give maintenance engineers the majority of their problems. The calcium, and magnesium contribute to hard water problems, and the iron and manganese contribute to colored water.

It is important to remember about hard water and dissolved solids that calcium bicarbonate is the calcium ion that is present in water if the pH is 7.9 or lower. The calcium in the water then changes its form

of calcium bicarbonate to either calcium carbonate or calcium hydroxide. These two chemicals are only slightly soluble in water and, therefore, precipitate out at the higher pH.

## Section 2.5: pH Control

The importance of pH control is often underestimated. An improper pH will adversely affect the: (1) clarity of the water, (2) bactericidal efficiency of chlorine, (3) odor of the water, skin and eye irritation to the swimmer, (4) corrosiveness of pool water, and (5) the ability of the pool water to maintain an adequate chlorine residual. The importance of proper pH control must be understood by the maintenance engineer in order to successfully maintain a sanitary and desirable pool.

Technically the pH is the measure of acidity or alkalinity of the pool water. Pool water is acid, neutral, or alkaline. The pH scale is from zero to 14. Any pH reading between zero and 7 is on the acid side. pH 7 is neutral, and any pH reading between 7 and 14 is alkaline. It is generally recognized that the optimum pool conditions exist when the pH range is between 7.2 and 7.6.

The effectiveness of chlorine and hypochlorites is at its greatest state when in this pH range. This is due to the fact that the percentage of hypochlorous acid formed is much greater in this pH range.

Any calcium ions present in the water are in the form of calcium bicarbonate which is infinitely soluble in this pH range. It is extremely difficult to have a pool form turbidity or turn cloudy if the

pH is maintained at a 7.2 to 7.6 range. Irritation to the eyes and nose of the swimmer is at a minimum in this pH range. A very interesting fact is that irritation to the eyes and other mucous membranes of swimmers is not caused by high chlorine but is cause by improper pH. This is particularly true if the pH goes below 7.2, and reacts with urine and other ammonia compounds in the water.

Adjusting the pH of the water is a simple matter, although it cannot be stated in an exact amount for a definite volume of water because of the many variables in water. For raising a pH which is below 7.2, soda ash may be added to the water until the pH has been raised to the correct range. To reduce a high pH, add muriatic acid, or sodium acid sulphate (sodium bisulphate), a powder, to the water until the pH has been lowered into the correct range. When adding acid material to the water, wait one hour after adding the acid material before testing the pH. Swimmers should not be allowed in the water for a minimum of ten minutes after the addition.

For the first two or three days, it will be difficult to maintain the proper pH range in the newly filled pool. The tendency will be for the pH of the water to rise. Therefore, extra care should be taken to take pH readings every hour during the early days of the newly filled pool to make sure that the pH is staying in the 7.2 to 7.6 range. After the first few days and after several additions of muriatic acid, most of the $CO_2$ in the water will have been depleted, thereby making it much easier to maintain the proper pH value.

In summary, it can be said that the pH of the water changes because of the addition of some chemicals. When a swimming pool is chlorinated by gas chlorine, the addition of gas chlorine to the water causes the formation of hypochlorous acid and a quantity of hydrochloric acid. This greatly reduces the pH to the acid side. When adding sodium hypochlorite to the pool as a source of chlorine, you are adding an alkaline material which will raise the pH. Therefore, in order to reduce the pH into the proper range, you must add muriatic acid.

Testing for pH is a very simple operation. Place a measured amount of phenol red in a stated solution of swimming pool water according to the manufacturer's directions, and compare this color against a standard set of colors. The results will determine the pH of the water.

There are other factors which can affect the pH of water such as, ammonia nitrogen material (urine and algae). The presence of urine in the water helps form ammonia nitrogen compounds which in turn contribute to chloramines which raises the pH of water and also forms a nutrient for algae. Algae also raises the pH of water because it removes $CO_2$ from the water.

## Section 2.6: Turbidity

All waters contain calcium ions in varying amounts. The calcium ion can either be a part of the water in its natural state or be added to the water in the form of chemicals or be a combination of both.

The calcium ion is very important to maintenance engineers in their efforts to maintain pool water with excellent clarity. One of the biggest problems is to maintain a clear pool. Generally speaking, when pool water does become turbid without the obvious addition of some unsoluble material, it can be accepted that the cloudiness was caused by a calcium ion.

This condition normally occurs if the pH of the water goes above 7.9. Since the optimum pH range is 7.2 to 7.6, it then will not occur if the pH is properly maintained.

The reason for this phenomenon is as follows. Any calcium ion present in water at a pH of below 7.9 is there in the form of calcium bicarbonate which is infinitely soluble in water. As the pH goes above 7.9, the calcium bicarbonate converts over to calcium carbonate or calcium hydroxide depending upon the other salts present.

Calcium hypochlorite products are moderately alkaline in nature and, therefore, may cause a temporary trail of turbidity when passing through pool water even though the pool water is in the 7.2 to 7.6 range. This is understandable when it is realized that due to the alkalinity of calcium hypochlorite, the immediate area around the particle has a pH range that is above the 7.9 maximum value. Therefore, minute amounts of calcium carbonate form.

It is also very apparent that the pH tends to rise when calcium hypochlorite products are used. Therefore, regular use of the pH test kit (see equipment) is necessary to insure that the pool water is maintained in the proper pH range.

## Section 2.7: Chlorine

The bactericidal properties of chlorine have been recognized for years. Chlorine, itself a gas, is extremely difficult to handle. For ease and convenience in handling products like sodium hypochlorite have been developed. These products are actually chlorine carriers. When added to water, they form hypochlorite solutions and thereby produce hypochlorous acid which is exactly what chlorine gas does when added to water. Since both chlorine and hypochlorites ionize in water to produce the hypochlorite ion and hypochlorous acid, it is obvious that the same equalibrium is established in water regardless of which is used.

Most bactericidal solutions containing a chlorine compound are rated in terms of available chlorine. The term "available chlorine" erroneously grew from the assumption that all of the chlorine of the chlorine molecule is utilized in disinfection reactions. Essentially it can be said that the available chlorine content of any chlorine compound is that amount of iodine it liberates from an acidified solution of potassium iodine and the calculated weight of chlorine required to liberate the same amount of iodine.

When chlorine compounds are added to water they form hypochlorous acid and HCl as well as the hypochlorite ion. HOCl or hypochlorous acid disassociates almost instantaneously into hydrogen and hypochlorite ions. The hypochlorous acid formation is extremely important because this is the end product that kills germs and algae and is the measurable residual chlorine. In general, it can be said that the

hypochlorous acid is at its maximum at the lower pH range scale and the hypochlorite ion is at its maximum at the high range of the pH scale. The optimum pH range from a chlorine stability standpoint and ability to kill bacteria is 7.2 to 7.6. When a pH is less than 7.2, the solution is extremely unstable and the element chlorine tends to form and escape to the atmosphere. At the pH vaules above 7.6, the hypochlorite ion becomes more predominate which is not good because the hypochlorite ion does not have any bactericidal properties. In other words, as the pH goes up, the bactericidal efficiency of the compound goes down.

Chlorine is added to the pool for two primary reasons:

1. For disinfection, in other words, to kill pathogenic organisms and algae.

2. As an oxidant to burn out undesirable solids, colors and odors.

It is very important to remember that chlorine residual will disappear because hypochlorous acid must decompose to be effective. In other words, hypochlorous acid will decompose in the process of killing bacteria and algae. Heat and light will also cause decomposition.

Chlorine residuals can either be in a free or combined form. Free chlorine (available) is hypochlorous acid in its so-called free state. Hypochlorous acid has the ability to kill germs and bacteria very quickly. However, hypochlorous acid will react with ammonia or ammonia compounds that may be in the water and forming chloramines. Chloramines are combined available chlorine and do not have the quick

bactericidal properties as the free hypochlorous acid. Urine contains ammonia and in most pool waters a certain amount of chloramines are formed from urine alone. Besides their relatively poor bactercidal and algaecidal properties, chloramines can be quite irritating and in some circumstances emit an obnoxious odor. Urine in swimming pool water is a contaminent of great concern as far as odor and skin irritation. When chlorinating in the presence of urine, various chloramines are formed together with a minor portion of nitrogen trichloride. Nitrogen trichloride is the most objectionable compound encountered in swimming pool sanitation. It is a lachrymator. It irritates or stings the eyes. As chlorine is added, most of the partly chlorinated urea or nitrogen trichloride is destroyed. However, after a considerable period of time the odor of nitrogen trichloride is still present. A shock treatment of available chlorine will be required to completely eliminate the offending odor.

A free available chlorine residual of .6 through 1.0 ppm should always be maintained in swimming pool water.

Testing for available chlorine is very simple. A specific quantity of orthotolidine is put into a specific quantity of swimming pool water according to the test kit manufacturer's directions. If available chlorine is present as free available chlorine, the kit will almost immediately give a color ranging from a very light yellow to dark brown or red in case of over-chlorination. When ammonia or amines are present in the water, it will take from five to ten minutes to obtain a complete available chlorine test. The color shown immediately on

making the test is the actual free available chlorine. However, if the test is allowed to stand five to ten minutes in the presence of amines, a higher reading will be obtained. This end reading indicates the amount of chlorine in the water. However, the end reading minus the original reading indicates the amount of combined chlorine present. This combined chlorine is not readily available for bacteria kill or algae kill. It is important to remember that only free residual available chlorine kills bacteria and algae immediately. Combined available chlorine does not have this property.

# SECTION 3

## ALUMINUM POOL MAINTENANCE AND FILTER OPERATION

Aluminum pools are a relatively new development in aquatic facility construction. The writer has been unable to find literature relating specifically to the maintenance of a swimming pool constructed from aluminum. Chester Pool Products, in Hamilton, Ohio, constructors of the South Dakota State University swimming pool have a booklet available for maintenance engineers concerning pool filter and maintenance data. Section 3 contains excerpts from this booklet.[1]

### Section 3.1: Filter and Pump Starting Procedure

1. Open valve #3. Fill tank to 8 inches above filter elements. Then close valve #3.
2. Make a slurry of diatomite and water in a pail or the filter pre-coat pot using 1 pound of diatomite to each 10 square feet of filter area.
3. Open valve #1, approximately one-half open.
4. Start pump.
5. Pour diatomite slurry into filter and run until water clears.
6. (a) In the following order, open valves #3, #2, and #5, (b) Close valve #1, (c) adjust valve #2 to required rate of turnover to read on flow meter at 270 GPM.

### Section 3.2: Filter Wash Down Procedure

1. Close valves #3 and #5.

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[1]Chester Products, Inc., op. cit.

2. Stop pump when water level drops to top of filter elements.

3. Check filter.

4. Close valve #2 and open valve #1.

5. Open valve #4 (start filter waste pump) with valve #6 opened.

6. As the filter tank is draining, wash all filter residue and dirt off the elements with washing tool supplied with filter and rinse tank clean.

7. Close valve #4 and stop filter waste pump and close valve #6.

8. Proceed as per above Start-Up Instructions.

## Section 3.3: Daily Routing

1. Check water and chemical feed rates as required.

2. Adjust valve #2 daily to correct flow rate.

3. Add diatomite to slurry feeder at a rate of 10 percent of pre-coat requirement. See item #2 in Start-Up Procedure.

## Section 3.4: Water Flow Control

1. Valve #3 open and 1 and 2 closed. All water bypasses heater and goes direct to pool.

2. Valve #3 closed. Valves #1 and #2 open, all water goes through heater and then to pool.

3. When heater is "on the line" during summer, adjust Valves #1, #2 and #3 to allow about 25 percent of the water to pass through heater.

## Section 3.5: Pool Water Heater Start-Up

1. Pool water should be circulated through the boiler at all times to prevent corrosion in the unit.

2. To light burners - FILTER PUMP MUST BE RUNNING

   a. Turn down pool water temperature control to its lowest setting.

   b. Press "ON" button of heater control.

   c. Turn on main manual gas valve and pilot valve.

   d. Press down on the safety pilot valve button and hold in while lighting pilot burner #1. After thermocouple #1 is hot, release button and pilot #1 will continue to burn.

   e. Turn knob on Thermopilot relay valve #2 to "on", light pilot and hold until thermocouple is hot, then release knob.

   f. With this pilot arrangement, failure of either pilot flame will result in complete 100 percent shut-off of gas to the main burner and any pilots not burning normally. If pilot failure occurs, determine the cause before attempting to relight the pilot burners.

   g. Check main gas valve to make sure manual control knob is in the automatic setting.

   h. Turn up pool water temperature control to desired temperature. Main gas burners will now light up.

   i. When starting up heater the first time, check primary air shutters on the main gas burners. The blue cone of the flame should be approximately 3/4 inch long. If flame is all yellow, increase air shutter opening. If flame dances above the burner ports, decrease shutter opening.

   j. In case of electrical power failure, the pool water heater will shut down. Before restarting, check pilot burner flame. If pilots are out, turn off main manual gas valve. Open all housing doors and/or lids and wait 30 minutes. Then check for pressure of gas in the heater housing. If the area is clear of gas, relight burners by following complete start-up procedures.

   k. When filter is shut down for cleaning, the pool water heater will automatically shut down. After pre-coat cycle has been completed, relight heater as per start-up instructions.

Section 3.6: Vacuum Cleaning

It will be necessary upon occasion to remove accumulations of foreign substances from the pool by means of a vacuum cleaner. Regularly scheduled vacuum cleaning will, as a rule, save time in the long run as well as keep the pool clean at all times for complete swimmer satisfaction.

Care should be taken to avoid striking the pool sides and bottom with the cleaner head in order to prevent chipping the paint.

Section 3.7: Surface Skimming

Chester Pool design incorporates an automatic skimming device around the entire perimeter of the pool. It is built into the easy roll-out ledge, not the drain slots which carry off surface water by means of the "covered scum gutter" or "overflow drain". In normal pool usage, swimmer splash effects the skimming. When the pool is quiet, here is how to skim it:

1. CLOSE the overflow valve. This valve is located in the filter on the right side of the equipment section.

2. OPEN the valve on the pool fill line. Raise water level in the pool and fill the overflow return duct until the pool water level is about 1/4 inch above the edge of the roll-out ledge, then turn off fill line valve.

3. OPEN the "Overflow to Waste" valve. This valve will be located in the manhole which is directly in front of the filter. In some installations, this valve will be located in the filter. Check your installation for the location of this valve. The excess water in the pool will flow out through the overflow duct, carrying all the floating debris away to the sewer.

Another method of skimming the pool is during the filter "wash-down" cycle. After the filter chamber has been drained and the elements

have been cleaned, flood the pool and drain off this water by opening the overflow valve in the filter and allow this water to run through the filter chamber to waste.

Section 3.8: Pool Draining

1. Inspect and check water waste disposal system, sump pump or building sewer lines. Before the pool drain valve is opened, be sure waste system is ready to handle disposal of pool water.

2. Open pool drain valve to about one half opening. Check waste disposal system to be sure it is handling the drain water. Open drain valve to capacity of the waste disposal sewer lines. Empty pool completely and flush interior of pool with hose. Wash off with detergent all water line marks at top of pool.

3. Shut off all city water service lines to the filter and pool. Drain these lines. Shut off and drain all special equipment water lines, such as pool spray system, etc.

4. After pool and all service lines are drained, remove hydro-relief plates from the bottom of the drain boxes. Open all valves in the filter. All valves are to be open during shut-down period.

5. Drain all water from the vacuum cleaner pump and strainer. If pump is gas engine driven, drain gas tank. Check for repairs and service. Store in a dry, heated place if possible.

6. Have competent electrician inspect and service under light fixtures. Check for condensate within fixture. Check all seals and gaskets for water tightness. Repair and replace.

7. Check pool surface for paint damage. Clean and touch up paint where required. If complete pool requires repainting, consult the pool manufacturer for recommendations.

8. Shut off all electrical service to pool and filter equipment that is not required for safety lighting or other service.

## Section 3.9: Filter and Pump Start-Up after Shut Down

1. Inspect all water service lines, pool recirculating system, and filter equipment for possible damage.

2. Check all valves in pool and filter system. Replace all drain plugs. Replace hydro-relief plates in the bottom of the drain boxes. Be sure gaskets are in good condition and all the surfaces are clean and free of all dirt, etc.

3. Check and turn on electrical service.

4. Turn on water service. Check for leaks.

5. Scrub down pool with soap and water. Flush all water to sewer.

6. Flush out Overflow Return System. Send water to waste.

7. Fill pool.

8. Check out filter and prepare to "start-up". Consult filter instruction manual.

# SECTION 4

## CURRICULUM PROGRAMMING

The survey data and related literature dealing with aquatics curriculum show that in an excellent aquatics program the following courses should be offered to the students. These courses are listed by title and credit hours only for it is not the purpose of this handbook to set guidelines for course content.

### Section 4.1: Aquatics Activity Courses

| | | |
|---|---|---|
| 1. | Beginning Swimming | One credit hour |
| 2. | Intermediate Swimming | One credit hour |
| 3. | Advanced Swimming | One credit hour |
| 4. | Lifesaving and Water Safety | One credit hour |
| 5. | Water Sports | One credit hour |
| 6. | Springboard Diving | One credit hour |

### Section 4.2: Theory and Practice Aquatics Courses

| | | |
|---|---|---|
| 1. | Water Safety Instruction Training | Three credit hours |
| 2. | Theory of Aquatics (For Majors) | One credit hour |
| 3. | Coaching and Teaching of Aquatic Skills | Two credit hours |

# SECTION 5

## INTRAMURAL ACTIVITIES

The survey of aquatics directors and swimming coaches and a study of the related literature shows a need for a complete and diversified intramural program. The following activities should be included in the intramural program. Lifeguards should be supplied by the department.

### Section 5.1: Student Recreational Swimming Time

The aquatics facility should be available to the students for their personal use daily. It is suggested that the swimming pool should be open for coeducational recreation swimming from 7:00 p.m. to 9:30 p.m. Monday through Sunday. Lifeguard fees should be paid through departmental funds.

### Section 5.2: Faculty Recreational Swimming Time

It is recommended that the South Dakota State University aquatics facility be available daily to faculty members for recreational swimming. It is suggested that the time from 11:30 a.m. to 1:00 p.m. Monday through Friday be utilized. Saturday and Sunday afternoon from 1:30 p.m. to 4:00 p.m. the pool should be available to University faculty and their families. It is recommended that a fee of $5.00 be charged per semester per faculty member and/or family.

Section 5.3: Men's Intramural Competitive Swimming

Competitive swimming involves a high degree of physical fitness for the participants. It is, therefore, recommended that a men's competitive swimming program include all events set forth in the NCAA Intercollegiate Swimming Guide, but the distance of these eleven events be cut in half.

Section 5.4: Men's Competitive Diving

It is realized that a competitive diver must work long hours to perfect his diving skills. An intramural competitive diving program should include five dives, as set forth by the NCAA Intercollegiate Swimming Guide. The participant should perform one dive of his choice from each of the five categories (front, back, inward, reverse, and twisting). The scoring should be done in the same manner as in an Intercollegiate Diving Meet.

Section 5.5: Women's Competitive Swimming

It is recommended that the women's competitive swimming program consist of the following events:

1. 200 yard medley relay
2. 200 yard freestyle
3. 100 yard individual medley
4. 50 yard breaststroke
5. 100 yard freestyle
6. 50 yard backstroke
7. 25 yard butterfly

8. 50 yard freestyle

9. 200 yard freestyle relay

Section 5.6: Intramural Club Programs

It is suggested that SCUBA diving, men's water polo, and women's synchronized swimming be conducted as club activities. These clubs should have access to the aquatics facility at convenient times throughout the week.

# SECTION 6

## AQUATICS FACILITY USAGE BY CLUBS AND GROUPS

After a thorough study of the survey questionnaire and the related literature, it is recommended that the South Dakota State University Natatorium be made available to both campus and town groups. It is suggested though that this service not be exploited but rather the groups concerned should feel that use of the pool is a privilege and must accept certain responsibilities.

### Section 6.1: Use of Aquatics Facility by Campus Organizations

It is recommended that South Dakota State University campus affiliated organizations be allowed use of the pool at times which do not conflict with departmental aquatics scheduling. Campus groups should pay an hourly rental fee of $7.50, and also pay the salary of needed lifeguards, (one lifeguard per 35 swimmers) at the rate of $2.00 each per pool hour.

### Section 6.2: Use of Aquatics Facility by Outside Organizations

It is recommended that South Dakota State University allow use of the aquatics facility by outside organizations at times that do not conflict with departmental aquatics scheduling. Outside organizations should pay an hourly rental fee of $12.50, and also pay the fee of needed lifeguards, (one lifeguard per 35 swimmers) at the rate of $2.00 each per pool hour.

# SECTION 7

## AQUATICS EQUIPMENT AND SUPPLIES

The equipment needed for an aquatics facility must be purchased after careful study and thought. It is not always the most expensive equipment that is the best, and conversely, the best equipment is not always the most expensive. The purpose of this section is to provide guidelines for acquisition of supplies and equipment not included in the pool contract. Maintenance supplies and equipment are not included in this section as it is felt that the pool manufacturer will provide a list of equipment needed to fit the particular installation at time of completion.

### Section 7.1: Basic Equipment and Supplies

1. Safety Equipment
   a. Ring buoys
   b. Lifeline ropes, 25 foot long
   c. Torpedo buoys
   d. Shepherds crook
   e. Aluminum rescue pole
   f. Resuscitator
   g. First aid kit
   h. Gas mask (required by law)

2. Testing Equipment
   a. pH control, and free chlorine test kit
   b. Submersible thermometer

3. Pool Equipment
   a. Deep water line marker
   b. Bulletin and notice board

Section 7.2: Instructional Equipment and Supplies

The following is meant to provide a list for successful swimming instruction. Other equipment not listed may be needed as curriculum increases.

1. Kickboards, styrofoam
2. Swim masks
3. Snorkels
4. Swim fins
5. Teaching pole with 6 inch arm loop
6. Teaching uniforms and suits
7. Life preservers (required by ARC)
8. Canoe for small craft instruction
9. Diving bricks

Section 7.3: Competitive Equipment

Because of the diversified equipment necessary to carry out an intercollegiate swimming program, the manufacturers are listed following their product. The writer highly recommends that these brand names be purchased over all others. Such companies are:

1. Kickboards, (Ocean Pool Supply Company, 17 Stepar Place, Huntington Station, New York 11746)
2. Diving Standards, Durafirm, used exclusively in all major competitive diving meets throughout the world (Arcadia Air Products Company, 383 North Altedena Drive, Pasadena, California 91107)
3. Diving Boards, Duraflex, used at all national meets and 1968 Olympics, (Arcadia Air Products Company)

4. Lane Markers, Adolph Kiefer Non-Turbulence Racing Lanes, official racing lanes 1968 Olympics, (Kiefer McNeil Corporation, 2741 Wingate Avenue, Akron, Ohio 44312)

5. Uniforms, Speedo, White Stag Corporation, Portland, Oregon.

## SECTION 8

## POOL REGULATIONS

1. All bathers before entering the swimming pool shall be required to TAKE A THOROUGH CLEANSING HOT SOAP SHOWER BATH IN THE NUDE and rinse off all soap suds before entering the pool.

2. Reshowers must be taken after using toilet facilities.

3. Check with the instructor or lifeguard before going into the pool with open sores, ear, eye, or nose infections or with bandages or adhesive tape on the body. If you feel ill check with the instructor before entering.

4. Spitting, spouting of water and blowing the nose in the swimming pool or on the swimming pool deck shall be strictly prohibited.

5. Unnecessary boisterousness or roughness or running shall not be permitted in the swimming pool, on the deck areas, in the dressing rooms, in the shower rooms or in the toilet rooms.

6. Swimming suits or bathing trunks of acceptable hygienic standards and style must be worn at all times.

7. Take no risk in the water when the diving springboards are in use. It is the responsibility of the individual diver to see that the area is clear. However, if swimmers see that the boards are in use, keep the area cleared.

8. To use the diving boards the swimmer must be able to swim one length of the pool or have the consent of the instructor in charge.

9. NO ONE is allowed to swim in the pool ALONE.

10. Do not enter the pool unless a certified SDSU guard is on duty.

11. The pool must be lighted to be used.

12. Diving from the three-meter boards is restricted to qualified divers who have satisfactorily demonstrated their ability to dive from this height.

13. No aquatic floats or toys allowed in the swimming pool unless previous arrangements have been made.

14. Only one individual at a time will be allowed on a diving board.

15. Canoes are to be used during class instructional program only.

16. The swimming instructor and/or lifeguard is in complete authority when the pool is open. HIS AUTHORITY IS ABSOLUTE.

17. All rules and regulations regarding health, safety and sanitation of the swimming pool must be strictly observed or the privilege of using the pool will be denied to the swimmers.

## SECTION 9

## MEET CHECKLIST

TYPIST _____

CLERK OF COURSE _____

ANNOUNCER _____

STARTER _____

TICKET TAKER _____

DIVING COMPUTER _____

TIMERS:

1. 7.
2. 8.
3. 9.
4. 10.
5. 11.
6. 12.

FINISH JUDGES:

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

DIVING JUDGES:

1.
2.
3.

STROKE & TURN JUDGES

1.
2.
3.

Starting Gun _____

Diving Scorecards _____

Diving Computing Table ____

Diving Entry Forms _____

Swimming Entry Forms _____

Typewriter _____

P.A. System _____

Table ____ Chairs _____

Lap Counters _____

Pennants _____

Information for Starter ___

Information for Announcer__

NCAA Rule Book _____

WATCHES:

1. 7.
2. 8.
3. 9.
4. 10.
5. 11.
6. 12.

## SECTION 10

## OPERATOR'S DAILY POOL REPORT[1]

Day _____ Date _____
Water Temperature _____ Temp. 10 a.m. ____ 4 p.m. ____
Pool Attendance _____ Temp. 10 a.m. ____ 4 p.m. ____

### Results of Daily Tests

| pH of Water | | Chlorine Residual | |
|---|---|---|---|
| 10 a.m. | _____ | 10 a.m. | _____ |
| 12 a.m. | _____ | 12 a.m. | _____ |
| 2 p.m. | _____ | 2 p.m. | _____ |
| 4 p.m. | _____ | 4 p.m. | _____ |
| 6 p.m. | _____ | 6 p.m. | _____ |

Physical Condition of Water _____

### Treatment Given

| | | |
|---|---|---|
| Filters Washed | Yes _____ | No _____ |
| Deep Area Vacuumed | Yes _____ | No _____ |
| Any Sign of Algae? | Yes _____ | No _____ |
| Pool Surroundings Inspected | Yes _____ | No _____ |
| Dressing Area Inspected | Yes _____ | No _____ |

### Chemicals Used

| | | |
|---|---|---|
| New Water Added | _____ | Gallons |
| Chlorine | _____ | Pounds |
| HTH Granular or Tablets | _____ | Pounds |
| Alkali: | | |
| pH Plus | _____ | Pounds |
| Soda Ash | _____ | Pounds |
| Liquid Caustic Soda | _____ | Pounds |
| Alum | _____ | Pounds |
| Algeate | _____ | Gallons |
| Super Algeate | _____ | Gallons |
| Copper Sulphate | _____ | Pounds |
| Celite | _____ | Pounds |

Remarks _____

_____

Operator sign 1st Operator _____

2nd Operator _____

Supplies Needed

Chlorine 150 lb. Cy'l _____
105 lb. Cy'l _____
HTH Tablets _____
HTH Granular _____
Alkali:
pH Plus _____
Soda Ash _____
Liq. Caustic Soda _____
Alum _____
Anhydrous ammonia _____
Copper Sulphate _____
Celite _____
Filter-Kleen _____
Test Set Solutions:
Orthotolidine _____
Phenol Red _____
Brom Thymol Blue _____
Algeate _____
Super Algeate _____
U-Britener _____
AP Cleanser _____
Hi-Tone _____
Spar-San _____
Unisoap _____

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[1]Council for National Cooperation in Aquatics, Lifeguard Training: Principles and Administration, ed. Gordon T. Howes (New York: Association Press, 1968), pp. 217-218.

## SECTION 11

## SWIMMING POOL REPORT[2]

(This form must be completed and turned into aquatics office Saturday)

| Week of | S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|---|
| No. of hours pool water heater operated | | | | | | | |
| No. of hours pump and filters operated | | | | | | | |
| Time that filter was washed | | | | | | | |
| Time required for washing filter | | | | | | | |
| Pounds of filter material used | | | | | | | |
| Pounds of alum used | | | | | | | |
| Quantity of disinfectant used | | | | | | | |
| Pounds of soda ash used | | | | | | | |
| Test No. 1 (Times of Test) | | | | | | | |
| Alkalinity | | | | | | | |
| Clearness of water | | | | | | | |
| Residual chlorine (ppm) | | | | | | | |
| Temperature of air | | | | | | | |
| Temperature of water | | | | | | | |
| Test No. 2 (Times of Test) | | | | | | | |
| Alkalinity | | | | | | | |
| Clearness of water | | | | | | | |
| Residual chlorine (ppm) | | | | | | | |
| Temperature of air | | | | | | | |
| Temperature of water | | | | | | | |
| Test No. 3 (Times of Test) | | | | | | | |
| Alkalinity | | | | | | | |
| Clearness of water | | | | | | | |
| Residual chlorine (ppm) | | | | | | | |
| Temperature of air | | | | | | | |
| Temperature of water | | | | | | | |
| Volume of new water added (reading) | | | | | | | |
| Time of cleaning pool | | | | | | | |
| Pump motor oiled | | | | | | | |
| Fan and motor oiled | | | | | | | |
| Time required to clean pool | | | | | | | |
| Vacuum | | | | | | | |
| Backwash | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Remarks: (List Maintenance Work) _____

Maintenance Engineer

---

[2]Ibid., p. 220.

## SECTION 12

## EMERGENCY STANDARD OPERATING PROCEDURE

### Emergency Procedures

Always attempt to anticipate the emergency situation developing and adjust the environment to avoid having to take emergency procedures.

### Rescue

Act! Do not wait to see if a problem exists. If a person needs assistance, give it before a real problem develops. Report all rescues.

### First Aid

All persons requiring first aid treatment, regardless of degree of injury, will be referred to the Student Health Service.

First aid equipment provided is for use in major emergencies only.

1. Drownings or Stoppage of Breathing. In all cases where breathing has stopped, the following procedure must be followed:

   a) Commence rescue breathing (oral resuscitation) as soon as possible. In most cases this will be in the water.

   b) Have another staff member or swimmer call the Campus Police, phone number 8-4921, and give location, University Swimming Pool, Health, Physical Education and Recreation Building. Continue rescue breathing.

c) Encourage swimmers to remain at a distance and try to set up conditions for continuation of normal activities. Assistance may be required.

d) Notify the Aquatics Director, phone _____, (Home _____)

e) Write up accident report. Obtain names (and written statements if possible) from three witnesses.

f) Prevent the development and spread of irresponsible heresay information by giving information to no one except University officials.

2. Bleeding

a) Attempt to stop bleeding by application of direct pressure. Elevate the wound if possible.

b) Phone the Campus Police, phone 8-4921 for assistance.

c) Write up accident report.

3. Fractured Bones

a) Make victim comfortable but make no attempt to move the broken limb.

b) Phone the Campus Police, phone 8-4921.

c) Write up accident report.

4. Unconsciousness

a) Make person comfortable and treat for shock (if red, raise head; if pale, raise feet).

b) Phone Campus Police, phone 8-4921.

c) Write up accident report.

SECTION 13

## ACCIDENT REPORT FOR AQUATICS[3]

Date _____

Three typed copies of this report must be filed, one for the Aquatics Director and two for the HPER Office, for every injury, no matter how trivial. Forms must be completed immediately after an injury occurs.

1. Victim's Name _____ Age _____
2. Address _____ Phone No. _____
3. Place where accident occurred _____
4. Accident occurred on: Date _____ Day _____ Hour _____
5. Describe the accident _____
   _____
   _____
6. Was injured disobeying any rule or regulation in force at the time of the accident? _____ Was the injured negligent? _____
   If so, in what way? _____
   _____
7. Supervisor in charge of activity at time of accident _____
8. Probable nature of injury _____
   _____
9. Nature of injury determined by _____
10. Persons present at the time of accident: Total No. _____
11. Names of those who saw accident _____ _____
    _____ _____ _____
    _____
12. What was done for the injured? _____
    _____
13. Remarks _____
    _____
    _____

Report submitted by:

_____

_____
Head Lifeguard

Received by Aquatics Director on _____

_____

[3]Ibid., p. 221.

## SECTION 14

## AQUATICS LIBRARY

The following publications should be included in the South Dakota State University Aquatics Library. It should be noted that there are at present two clearing houses for aquatics publications. These are (1) Swim Central, 3301 N. E. 15th Street, Ft. Lauderdale, Florida 33308 and (2) Hoffman Publications, Inc., Sunrise Professional Building, Ft. Lauderdale, Florida 33304.

1. All About Dry Land Exercises for Swimmers, Divers and Synchronized Swimmers, Buck Dawson, (Swim Central).
2. Aquatics Handbook, ed. M. A. Gabrielson, (Hoffman Publications).
3. Aquatics for the Handicapped, (Hoffman Publications).
4. Basic Pool Filtration and Chemistry, David Thomas, (Swim Central).
5. Diving: For Teacher and Pupil, Rosemary Dawson, (Swim Central).
6. Forbes Carlile on Swimming, Forbes Carlile, (Swim Central).
7. Legal Problems Affecting Swimming Pools, Hoffman Publications.
8. Lifeguard Training: Principals and Administration, CNCA, (New York: Association Press).
9. Lifesaving and Water Safety, American National Red Cross, (Washington: American National Red Cross).
10. Official Collegiate Swimming Guide, NCAA (Phoenix: College Athletic Publishing Service).
11. Naval Aviation Physical Training Manuals, Vol. VIII, Swimming (Annapolis: United States Naval Institute).

12. New YMCA Aquatic Workbook (Hoffman Publications).

13. Olin "HTH Pool Life", Olin Chemicals Group (Stamford, Conn.)

14. Pool and Filter Instruction Data, Chester Products, Inc. (Hamilton, Ohio).

15. Sports and Recreation Facilities for School and Community, M. A. Gabrielson and C. M. Miles (Hoffman Publications).

16. Swimming Pool Data and Reference Annual (Hoffman Publications).

17. Swimming and Diving, David A. Armbruster and others (St. Louis: C. V. Mosby Company).

18. Swimming Pools for Schools, Donald Neilson and John Nixon (Stanford: Stanford University Press).

19. Swimming Pool Weekly and Swimming Pool Age (Hoffman Publications).

20. Swimming Technique, (12618 Killion Street, North Hollywood, Calif. 91607).

21. Swimming World and Junior Swimmer, (12618 Killion Street, North Hollywood, Calif. 91607).

22. The Science of Swimming, James Counsilman (Hoffman Publications).

23. The Science of Skin and SCUBA Diving (Hoffman Publications).

24. Swimming Pool's A Contractors Folio, H. C. Bennett (Hoffman Publications).

25. Swimming Pools: A Guide to Their Planning, Design and Operation, CNCA, ed. M. A. Gabrielson (Hoffman Publications).

# BIBLIOGRAPHY

American Association of Health, Physical Education, and Recreation. Intramural Sports for College Men and Women. Washington: American Association of Health, Physical Education and Recreation, 1964.

American National Red Cross. Lifesaving and Water Safety. Washington: American Red Cross, 1968.

Armbruster, David A., David Allen, and Hobart Billingsley. Swimming and Diving. St. Louis: C. V. Mosby Company, 1968.

Chester Products, Incorporated. Pool and Filter Instruction Data. Hamilton, Ohio: Chester Products, Incorporated, 1969.

Council for National Cooperation in Aquatics. Lifeguard Training, Principles and Administration, ed. Gordon T. Howes. New York: Association Press, 1968.

Council for National Cooperation in Aquatics. Swimming Pools, A Guide to Planning, Design and Operation, ed. M. A. Gabrielson. Ft. Lauderdale: Hoffman Publications Incorporated, 1969.

Flagg, Paul J. The Art of Resuscitation. New York: Reinhold Publishing Corporation, 1944.

Foss, Peggy M. "The Attitudes of South Dakota State College Women Students Toward Physical Education." Unpublished Master's thesis, South Dakota State College, 1960.

Gabrielson, M. Alexander. Aquatics Handbook. Englewood Cliffs, N.J.: Prentice-Hall, Incorporated, 1960.

Goff, Robert. "A First Class Swimming Program," Swimming Technique. Volume VII, No. 2, 1970.

Good, Carter and Douglas E. Scates. Methods of Research. New York: Appleton Century and Crofts, Incorporated, 1954.

Hubbard, Charles. "Swimming Pool Operation, Maintenance, and Programming," Twelfth Annual Meeting, Council for National Cooperation in Aquatics, ed. T. Hutson. Washington: Council for National Cooperation in Aquatics, 1962.

LaPorte, William R. The Physical Education Curriculum--A National Report. Los Angeles: University Press, University of Southern California, 1932.

Mahoney, Jay E. "Pool Maintenance," Twelfth Annual Meeting, Council for National Cooperation in Aquatics, ed. T. Hutson. Washington: Council for National Cooperation in Aquatics, 1962.

National Collegiate Athletic Association. Official Swimming Guide, ed. Vic Gustafson. Phoenix: College Athletics Publishing Service, 1970.

National Safety Council. Accident Facts. Chicago: National Safety Council, Incorporated, 1968.

Neilson, Donald W. and John Nixon. Swimming Pools for Schools. Stanford: Stanford University Press, 1954.

Robertson, David. "Organizing a School-Community Aquatics Program," Aquatics Handbook, ed. M. A. Gabrielson. Englewood Cliffs, N.J.: Prentice-Hall, Incorporated, 1960.

Scott, Gladys M. Research Methods in Health, Physical Education and Recreation. New York: Harper and Brothers Company, 1967.

Sluiter, Floyd D. "The Attitudes of Men Students Toward Required Physical Education at South Dakota State College." Unpublished Master's thesis, South Dakota State College, 1959.

Stack, H. J. and E. B. Siebrecht. Education for Safe Living. Englewood Cliffs, N. J.: Prentice-Hall, Incorporated, 1945.

United States Naval Institute. The Naval Aviation Physical Training Manuals, Volume VIII, Swimming. Annapolis: United States Naval Institute, 1944.

# APPENDIXES

# APPENDIX A

## AQUATICS DIRECTORS AND SWIMMING COACHES SURVEYED

| Name | University or College | City and State |
|---|---|---|
| William Irwin | Adelphi University | Garden City, NY |
| Dale Stewart | University of Akron | Akron, OH |
| Earl Detrick | University of Alaska | College, AK |
| Brian Kelly | Albany University | Albany, NY |
| Joe Rogers | American University | Washington, DC |
| Ole Larson | Appalachian State Univ. | Boone, NC |
| Chuck Guemple | Ball State University | Muncie, IN |
| Lee Albrecht | Bemidji State College | Bemidji, MN |
| David Thomas | Binghamton University | Binghamton, NY |
| Jim Spink | Bradley University | Peoria, IL |
| Willard Tuomi | Carleton College | Northfield, MN |
| Steve Fagan | Carnegie-Mellon Univ. | Pittsburgh, PA |
| Jack Suydam | Central Connecticut State | New Britan, CT |
| Jerry Misner | Central Michigan Univ. | Mt. Pleasant, MI |
| Tom Hairabedian | Central Missouri College | Warrensburg, MO |
| Bob Gregson | Central Washington State | Ellensburg, WA |
| Pat Colgate | Chadron State College | Chadron, NB |
| Ernest Maglischo | Chico State College | Chico, CA |
| Carl McHugh | Clemson University | Clemson, SC |
| Robert Busbey | Cleveland State Univ. | Cleveland, OH |
| Jerry Lear | Colorado College | Colorado Springs, CO |
| Art Solow | Colorado State Univ. | Ft. Collins, CO |
| Steve Miller | Cornell College | Mt. Vernon, IA |
| Peter Carhart | Cornell University | Ithaca, NY |
| Jordan Detzer | Dakota Wesleyan Univ. | Mitchell, SD |
| Harry Rawstrom | University of Delaware | Newark, DE |
| Tom Murphy | University of Denver | Denver, CO |
| Mike Ryan | Dickinson State College | Dickinson, ND |
| William Logue | Drexel Institute of Tech. | Philadelphia, PA |
| W. S. Persons | Duke University | Durham, NC |
| Ray Scharf | East Carolina University | Greenville, NC |
| Harvey Miller | East Texas State Univ. | Commerce, TX |
| Ray Padovan | Eastern Illinois Univ. | Charleston, IL |
| Donald Combs | Eastern Kentucky Univ. | Richmond, KY |
| Michael Jones | Eastern Michigan Univ. | Ypsilanti, MI |
| Richard Dart | Eastern New Mexico Univ. | Portales, NM |
| Gene Lisieky | Eastern Washington State | Cheney, WA |
| | Edinboro State College | Edinboro, PA |
| Edward Smyke | Emory University | Atlanta, GA |
| Richard Schleicher | University of Evansville | Evansville, IN |

APPENDIX A (Continued)

| Name | University or College | City and State |
|---|---|---|
| Waldon Skinner | Fairmont State College | Fairmont, WV |
| Lyn Lawson | Federal City College | Washington, DC |
| George Gibbens | Florence State University | Florence, AL |
| Joseph Bernal | Fordham University | New York, NY |
| Ara Harabedian | Fresno State College | Fresno, CA |
| Jake Hengstler | Georgetown University | Washington, DC |
| Herb McAuley | Georgia Institute of Tech. | Atlanta, GA |
| Buddy Floyd | Georgia Southern College | Statesboro, GA |
| Virden Evans | Grambling College | Grambling, LA |
| Vic Gustafson | Gustavus Adolphus College | St. Peter, MN |
| Robert Leahy | Hamline University | St. Paul, MN |
| Dr. Gammill | Henderson State College | Arkadelphia, AR |
| L. D. Roberts | Herbert H. Lehman College | Bronx, NY |
| Walter Stone | Hofstra University | Hempstead, NY |
| | Howard University | Washington, DC |
| James Malone | Humboldt State College | Arcata, CA |
| Raymond Welsh | Hunter College | New York, NY |
| | Idaho State University | Pocatello, ID |
| Chet Hall | University of Idaho | Moscow, ID |
| Gus Jones | Illinois Teachers College | Chicago, IL |
| Eugene Lepley | Indiana University | Indiana, PA |
| William Ware | Ithaca College | Ithaca, NY |
| Carman Weathers | Jackson State College | Jackson, MS |
| Barry Higgins | Jersey City State College | Jersey City, NJ |
| Joe Murphy | Kansas State College | Pittsburg, KS |
| Barry Johnson | Kearney State College | Kearney, NB |
| Bob Keck | Illinois Wesleyan Univ. | Bloomington, IL |
| Robert Allen | University of Iowa | Iowa City, IA |
| Jack McGuire | Iowa State University | Ames, IA |
| William Lawson | Lafayette College | Easton, PA |
| | LaSalle College | Philadelphia, PA |
| Harold Hacker | Lock Haven State College | Lock Haven, PA |
| Thomas Ross | Long Island University | Brooklyn, NY |
| Maurice Greer | Louisiana Polytechnic Inst. | Ruston, LA |
| Robert Brown | Louisiana State Univ. | New Orleans, LA |
| Jeff Johnston | University of Louisville | Louisville, KY |
| A. G. Carrow | Lowell Technological Inst. | Lowell, MA |
| Louis Scheuermann | Loyola University | New Orleans, LA |
| Ralph Erikson | Loyola Univ. of Chicago | Chicago, IL |
| Jay McGrew | Luther College | Decorah, IA |
| John Backman | Macalester College | St. Paul, MN |
| R. J. Martin | Madison College | Harrisonburg, VA |
| Samuel Sezak | University of Maine | Orono, ME |

APPENDIX A (Continued)

| Name | University or College | City and State |
|---|---|---|
| Don Robinson | Mankato State College | Mankato, MN |
| Donald Clark | Marquette University | Milwaukee, WI |
| Bob Saunders | Marshall University | Huntington, WV |
| Charles Batterman | Massachusetts Inst. of Tech. | Cambridge, MA |
| Paul Abramson | Metro State College | Denver, CO |
| | University of Miami | Coral Cables, FL |
| Raymond Ray | Miami University | Miami, OH |
| Mike Wiener | Michigan Tech. Univ. | Houghton, MI |
| Joe Ruffner | Middle Tennessee State Univ. | Murfreesboro, TN |
| Robert Norris | Millersville State College | Millersville, PA |
| Dave Jordet | Univ. of Minnesota, Duluth | Duluth, MN |
| Wayne Simpson | Univ. of Minnesota, Morris | Morris, MN |
| Wiley Wilson | Minot State College | Minot, ND |
| Tom D'Armi | Mississippi State Univ. | State College, MS |
| B. L. Graham | Univ. of Mississippi | University, MS |
| Bob Pease | Univ. of Missouri, Rolla | Rolla, MO |
| Henry Andrew | Monmouth College | Monmouth, IL |
| Richard Steadman | Monmouth College | West Long Branch, NJ |
| Keith Lambert | Montana State Univ. | Bozeman, MT |
| Fred Stetson | University of Montana | Missoula, MT |
| Bill Mack | Morehead State Univ. | Morehead, KY |
| John Reta | University of Nebraska | Lincoln, NB |
| Bert Kurth | Univ. of Nebraska, Omaha | Omaha, NB |
| Lee Newell | Univ. of Nevada, Reno | Reno, NV |
| | Univ. of New Hampshire | Durham, NH |
| John Donnelly | New Mexico Highlands Univ. | Las Vegas, NM |
| Jack Welch | New Mexico State Univ. | Las Cruces, NM |
| John Mechem | Univ. of New Mexico | Albuquerque, NM |
| Gregory Kenney | State Univ. College of NY | Brockport, NY |
| Richard Heller | State Univ. College of NY | Buffalo, NY |
| Donald Ball | State Univ. College of NY | Oneonta, NY |
| Tom Sheeran | Niagra University | Niagra University, NY |
| Ed Boney | Northern Arizona Univ. | Flaggstaff, AZ |
| Isaiah Trice | North Carolina A & T College | Greensboro, NC |
| Don Easterling | North Carolina State Univ. | Raleigh, NC |
| Ed Kral | North Central College | Naperville, IL |
| Jim Driscoll | North Dakota State Univ. | Fargo, ND |
| Arnold Keck | University of North Dakota | Grand Forks, ND |
| Don Baily | North Texas State Univ. | Denton, TX |
| Ron Beaverson | Northeastern State College | Tahlequah, OK |

APPENDIX A (Continued)

| Name | University or College | City and State |
|---|---|---|
| Hal McKain | Northern Colorado Univ. | Greeley, CO |
| David Hallberg | Northern Illinois Univ. | DeKalk, IL |
| Glen Henry | Univ. of Northern Iowa | Cedar Falls, IA |
| Don Trost | Northern Michigan Univ. | Marquette, MI |
| Bert Berndt | Northern State College | Aberdeen, SD |
| Lewis Dyche | Northwest Missouri State | Maryville, MO |
| Ernest Hill | Northwestern State College | Natchitoches, LA |
| Bob Steele | Northwestern University | Evanston, IL |
| Corey Van Fleet | Oakland University | Rochester, MI |
| Richard Michaels | Oberlin College | Oberlin, OH |
| Fletchers Gilders | Ohio University | Athens, OH |
| Charles Jackson | Old Dominion University | Norfolk, VA |
| Bill Rose | Univ. of the Pacific | Stockton, CA |
| Randolph Chavis | Pan American College | Edinburg, TX |
| Arthur Raidy | Paterson State College | Wayne, NJ |
| George Breens | Univ. of Pennsylvania | Philadelphia, PA |
| Don Duncan | Univ. of Puget Sound | Tacoma, WA |
| Charles Arnold | Univ. of Rhode Island | Kingston, RI |
| Wade Anderson | Ricks College | Rexburg, ID |
| Rufus Wilson | St. Cloud State College | St. Cloud, MN |
| Rolf Mellby | St. Olaf College | Northfield, MN |
| Mike Lehman | Univ. of San Francisco | San Francisco, CA |
| Barney Koch | Seattle University | Seattle, WA |
| James Igli | Slippery Rock State College | Slippery Rock, PA |
| Tim Shuminsky | University of South Dakota | Vermillion, SD |
| Robert Grindey | Univ. of South Florida | Tampa, FL |
| Laverne Lauxman | Southeast Missouri State | Cape Girardeau, MO |
| Bruce Hutchinson | Southern Connecticut State | New Haven, CT |
| A. R. Barr | Southern Methodist Univ. | Dallas, TX |
| Lee Howard | Southern Oregon College | Ashland, OR |
| Cleo Petty | Southern Utah State | Cedar City, UT |
| Don Palm | Southwest Minnesota State | Marshall, MN |
| Charles Silva | Springfield College | Springfield, MA |
| Jim Gaughran | Stanford University | Stanford, CA |
| Robert Smith | Stout State University | Menomonie, WI |
| Ray Drost | Tennessee Tech. Univ. | Cookeville, TN |
| Thomas Hughes | Tennessee A & I State | Nashville, TN |
| Rufe Brewton | Texas Christian Univ. | Fort Worth, TX |
| Doug Russell | University of Texas | Arlington, TX |
| Edward Melvin | University of Toledo | Toledo, OH |
| Ray Riordan | Towson State College | Towson, MD |
| Dick Bower | Tulane University | New Orleans, LA |

APPENDIX A (Continued)

| Name | University or College | City and State |
|---|---|---|
| Art Mendini | Utah State University | Logan, UT |
| Don Reddish | University of Utah | Salt Lake City, UT |
| Leslie Leggett | University of Vermont | Burlington, VT |
| Ron Good | University of Virginia | Charlottesville, VA |
| Leo Ellison | Wake Forest University | Winston-Salem, NC |
| George Parker | Washburn University | Topeka, KS |
| Douglas Gibb | Washington State Univ. | Pullman, WA |
| Don McIntosh | Washington University | St. Louis, MO |
| Roger Bentley | Wayne State College | Wayne, NB |
| Lynn Corbridge | Weber State College | Ogden, UT |
| Tom Grall | West Liberty State | West Liberty,WV |
| Bob Conner | West Texas State Univ. | Canyon, TX |
| James Bryant | Western Carolina Univ. | Cullowhee, NC |
| Scott Greer | Western Illinois Univ. | Macomb, IL |
| Bill Powell | Western Kentucky Univ. | Bowling Green, KY |
| Dick Newman | Western State College | Gunnison, CO |
| Don Wiseman | Western Washington State | Bellingman, WA |
| John Martin | Winona State College | Winona, MN |
| Tom Prior | Wisconsin State Univ. | Eau Claire, WI |
| Mike Miller | Wisconsin State Univ. | LaCrosse, WI |
| James Davies | Wisconsin State Univ. | Oshkosh, WI |
| Glenn Bestor | Wisconsin State Univ. | Platteville, WI |
| Archie Harris | Illinois State Univ. | Normal, IL |
| Joe Phillips | University of Wyoming | Laramie, WY |
| | Univ. of South Alabama | Mobile, AL |
| Mike Stevenson | University of Hawaii | Honolulu, HI |
| Alan Gentry | Univ. of South Carolina | Columbia, SC |
| James Counsilman | Indiana University | Bloomington, IN |

# APPENDIX B

## INFORMATION CONCERNING SWIMMING INSTRUCTION, INTRAMURAL, COACHING PROGRAMS, STAFFING, AND MAINTAINING AN AQUATIC FACILITY AT A COLLEGE OR UNIVERSITY

DIRECTIONS: Please check the correct answer for each statement:

### STATEMENTS

A. GENERAL

1. Does your institution have a handbook available to staff and employees that covers swimming pool operation and maintenance?

   _____ YES

   _____ NO

2. Does your institution employ a full-time aquatics director or do several faculty members share the responsibility?

   _____ Full-Time Aquatics Director

   _____ Several Share The Responsibility

   You may comment if you wish:

3. Does your institution carry liability insurance specifically covering the aquatics program?

   _____ YES

   _____ NO

   You may comment if you wish:

4. Does your institution hire graduate assistants specifically to help with the aquatics program?

   _____ YES

   _____ NO

5. Does your institution require lifeguards, in addition to the instructor to be on duty whenever the pool is in use?

_____ YES

_____ NO

You may comment if you wish:

6. Is the aquatics director in charge of all pool scheduling?

_____ YES

_____ NO

If no, specify _____

_____

7. Is your facility used during the summer months for an Amateur Athletic Union competitive program?

_____ YES

_____ NO

You may comment if you wish:

B. AQUATICS CURRICULUM

8. Is physical education required at your institution?

_____ YES ___ 1 year, ___ 2 years, ___ 3 years, ___ 4 years

_____ NO

You may comment if you wish:

9. Must all students, to meet the requirements of graduation, pass a swimming test?

_____ YES

_____ NO

You may comment if you wish:

10. Are all physical education majors required to pass a swimming test as part of their professional preparation?

_____ YES

_____ NO

You may comment if you wish:

11. The instructional swimming program is taught by the following:

_____ Full-Time Instructors

_____ Graduate Assistants

_____ Combination of the above

_____ Others, (specify) _____

_____

12. Do athletes or others on government work study, or other financial aid assist in your aquatics program?

_____ YES _____ Instructors, _____ Lifeguards, _____ Maintenance, _____ Other

_____ NO

You may comment if you wish:

13. Do all of your teaching faculty associated with aquatics hold an American Red Cross water safety instructor's certificate or similar document?

_____ YES

_____ NO

You may comment if you wish:

14. Approximately how many students compose a basic instruction swimming class?

_____ (Number)

You may comment if you wish:

15. Does your institution offer a course <u>in theory</u> of swimming or a similar course? How many credits?

_____ YES _____ Credits

_____ NO

16. Does your institution offer a course in coaching and teaching of aquatic skills? How many credits?

_____ YES _____ Credits

_____ NO

17. Which of the following aquatics courses does your institution offer, and for how many credits?

___Beginning Swimming ___½, ___1, ___2, ___3, other_____

___Intermediate Swimming ___½, ___1, ___2, ___3, other_____

___Advanced Swimming ___½, ___1, ___2, ___3, other_____

___Lifesaving ___½, ___1, ___2, ___3, other_____

___Water Safety Instruction ___½, ___1, ___2, ___3, other_____

___SCUBA Diving ___½, ___1, ___2, ___3, other_____

___Synchronized Swimming ___½, ___1, ___2, ___3, other_____

___Diving ___½, ___1, ___2, ___3, other_____

___Other (specify) _____

C. <u>INTRAMURALS</u>

18. Does your institution have an aquatics intramural program? If yes, what areas does it cover?

_____ YES

_____ Competitive Swimming, Men

_____ Competitive Swimming, Women

_____ Diving, Men

_____ Diving, Women

18. Does your institution have an aquatics intramural program? If yes, what areas does it cover? (continued)

_____ Water Polo

_____ Synchronized Swimming

_____ Other, (specify) _____

_____ NO, do not have program

19. Who administers the intramural program?

_____ An Intramural Director

_____ Coaches of the Various Sports

_____ Combination of the Above

_____ Other, (specify) _____

_____

20. Is your pool open to students for recreational swimming?

_____ YES

_____ NO

You may comment if you wish:

21. Is your pool open to all faculty for recreational swimming?

_____ YES

_____ NO

You may comment if you wish:

22. Does your institution permit use of the pool by campus affiliated organizations? Do you charge a rental fee? How much?

_____ YES, we permit use of the pool

_____ NO, we do not permit use of the pool

_____ Yes, but we charge a rental of _____ per hour.

You may comment if you wish:

23. Does your institution permit use of the pool by outside organizations? Do you charge a rental fee? How much?

_____ YES, we permit use of the pool

_____ NO, we do not permit use of the pool

_____ YES, but we charge a fee of _____ per hour.

You may comment if you wish:

D. INTERCOLLEGIATE COMPETITION

24. Does your institution have a men's intercollegiate swimming team?

_____ YES

_____ NO

You may comment if you wish:

25. Does your institution have an organized water polo team?

_____ YES

_____ NO

You may comment if you wish:

26. Does your institution have a women's swimming team?

_____ YES

_____ NO

You may comment if you wish:

27. Does your institution offer scholarships for aquatic skills? In what areas?

_____ YES, we offer scholarships

_____ Competitive Swimming

_____ Competitive Diving

_____ Water Polo

_____ Other, (specify) _____

_____ NO, we do not offer scholarships

You may comment if you wish:

E. EQUIPMENT

28. Does your institution have a separate aquatics equipment room or are all items checked out through the main equipment room?

_____ YES, separate room

_____ NO

You may comment if you wish:

F. MAINTENANCE

29. Do you employ a maintenance man whose main duty it is to take care of the pool?

_____ YES

_____ NO

You may comment if you wish:

30. Are a chemical and filtering operations handled by one person?

_____ YES

_____ NO

You may comment if you wish:

G. FACILITY

31. Is the pool at your institution constructed from (a) concrete, (b) concrete and tile, (c) aluminum?

_____ CONCRETE

_____ CONCRETE AND TILE

_____ ALUMINUM

You may comment if you wish:

32. Does your aquatics facility have defined teaching stations for the instruction of classes?

_____ YES

_____ NO

You may comment if you wish:

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H. REMARKS:

November 7, 1970

Aquatics Director
Department of Health, Physical
Education and Recreation

Dear Sir:

As a graduate student in Health, Physical Education, and Recreation at South Dakota State University, Brookings, South Dakota, I am endeavoring to complete a study for the Master of Science degree. As South Dakota State University has begun construction on a 3.75 million dollar physical education complex, my research will attempt to develop a broad and comprehensive aquatics program. A manual of operation, pool maintenance, and staffing of the yet to be completed swimming and aquatics facility will be thoroughly researched.

In an attempt to accomplish my objectives, I have prepared a questionnaire for Aquatics Directors of colleges and universities of the approximate size of South Dakota State University.

I am seeking your assistance and it is my sincere hope that you, being a director of aquatics of a college or university, will find time during your busy schedule to participate in this survey.

I would appreciate your answering and returning the questionnaire as soon as possible. A stamped self-addressed envelope is enclosed for your use. If you institution has a manual or handbook concerning my topic, I would appreciate reading and listing it in my related literature chapter. I would return it within a week.

Sincerely yours,

Dwight L. Hunter
Graduate Student
South Dakota State University

This thesis study has been approved by the Health, Physical Education and Recreation Department at South Dakota State University. I would appreciate any assistance you can give Mr. Hunter.

Stanley J. Marshall
Director of Health, Physical
Education, Recreation and
Athletics
South Dakota State University

November 30, 1970

Dear Sir:

Some time ago 193 selected aquatics directors and swimming coaches of colleges and universities of the approximate size of South Dakota State University were mailed a questionnaire concerning information on swimming instruction, intramural, coaching programs, staffing, and maintaining an aquatics facility. To date, 64 percent of the selected aquatics directors and swimming coaches have returned the questionnaire.

Upon checking my records, I see that you have not returned the questionnaire and I am most hopeful that I may include your data in my study. If you have misplaced the original or did not receive one, please find another copy of the questionnaire enclosed to be completed by you.

The validity of my research is dependent on the percentage of returns that I receive. Therefore, it is essential that all questionnaires be returned. Will you please take a few moments of your time and fill out the enclosed questionnaire? A self-addressed, stamped envelope is enclosed for your convenience in mailing the questionnaire.

If your questionnaire is now in the mail, please disregard this letter. Thank you.

Sincerely yours,

Dwight L. Hunter
Graduate Student
Department of Health, Physical Education and Recreation
South Dakota State University
Brookings, South Dakota 57006