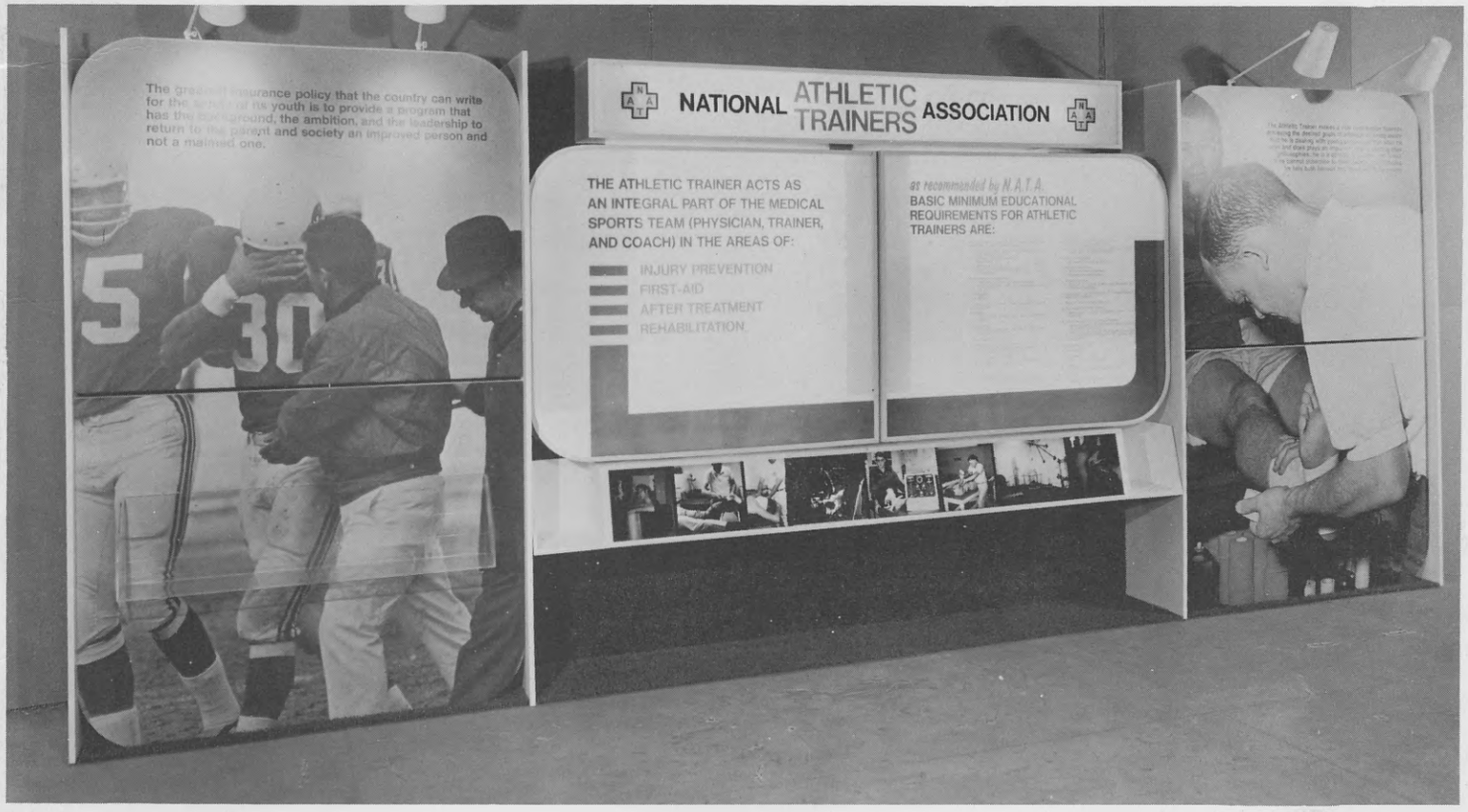
THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

VOLUME 5 NUMBER 3 FALL 1970



when you need it... you've got it

HOT or COLD . . . now instant treatment with *TempAid*®. Easy to activate and easy to apply. *TempAid* is an invaluable aid on and off the playing field. Quickly activated, COLDPACK stabilizes at a residual temperature of 31°F, and HOTPACK at 120°F.

Indispensable for effective first-aid on the field, *TempAid* is particularly beneficial in the locker room. It provides instant therapeutic treatment and its ease of use makes possible continued treatment by the athlete at home.

Simply activate, apply and forget it. What could be easier and yet so effective. See your nearby Riddell dealer today, or write: Riddell, Inc., Des Plaines, Illinois 60018.

RIDDELL®

the athletes finest


...SIDE-LINE SIDER T.M.
NEW!
ELECTROLYTE
THIRST QUENCHER
IDEAL IN CONTENT
PERFECT IN FLAVOR
COACH
SIDE-LINE SIDER
SIDE-LINE SIDER
SIDE-LINE SIDER
Cramer
Manufactured By
cramer products, inc.
GARDNER, KANSAS U.S.A. 66030


TWO NEW PRODUCTS JOIN CRAMER'S TEAM
DINE-A-PAK®
500
Each delicious chocolate flavored meal has 500 calories with the nutrition needed for people on the go.
AND...
CHOCOLATE
DINE-A-PAK®
ATHLETIC LIQUID MEAL
24-10 OZ. CANS
cramer
Distributed By
cramer products, inc.
GARDNER, KANSAS U.S.A. 66030
cramer

THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

VOLUME 5 NUMBER 3 FALL 1970

CONTENTS

The Journal of the National Athletic Trainers Association is published quarterly by the National Athletic Trainers Association, a non-profit organization, 3315 South Street, Lafayette, Indiana 47904.

Second class postage paid at Lafayette, Indiana 47904.

The Journal goes to members of the Association as a part of their membership dues of $25 (3.00 of which is for Journal); advisory members and student members (undergraduates only) pay annual dues of $10 (3.00 of which is for Journal). Annual subscription rate to nonmembers, institutions and libraries $5.

CHANGE OF ADDRESS may be made by sending old address and new address with zip code number. Instructions should state whether change is temporary or permanent. Allow thirty days for changeover. Address changes should be sent to 3315 South Street, Lafayette, Indiana 47904.

SUBMITTING MANUSCRIPTS — Information concerning manuscripts for publication in the Journal appears under "Guide for Contributors" on page 32 of this issue.

ADVERTISING—Although advertising is screened, acceptance of the advertisement does not necessarily imply NATA endorsement of the product or the views expressed. Advertising rates available on request, 600 S. Michigan Avenue, Chicago, Illinois 60605.

THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

President
ROBERT GUNN
Lamar Tech
Beaumont, Texas 77705

Executive Director
JACK ROCKWELL
524 Hickory Hollow
Kirkwood Missouri 63122

BOARD OF DIRECTORS

Dist. 1 Fritz Massmann
Boston College
Chestnut Hill, Mass. 02167

Dist. 2 Francis J. Sheridan
Lafayette College
Easton, Pa. 18042

Dist. 3 Joseph Gieck
University of Virginia
Charlottesville, Va. 22903

Dist. 4 Roland E. La Rue
Western Hall
Western Illinois University
Macomb, Illinois 61455

Dist. 5 Byron J. Bird
Athletic Department
Oklahoma State University
Stillwater, Oklahoma 74074

Dist. 6 Tom Wilson
Athletic Department
University of Houston
3855 Holman Street
Houston, Texas 77004

Dist. 7 Jack Aggers
University of Wyoming
P.O. Box 3414
Laramie, Wyoming 82070

Dist. 8 Richard Vandervoort
Washington State University
Pullman, Washington 99163

Dist. 9 Chris Patrick, Jr.
University of Florida
Florida Stadium
Gainesville, Florida 32601

Dist. 10 Mert Prophet
York University
Keele and Steele Ave.
Toronto, Ontario, Canada

DISTRICT SECRETARIES

Dist. 1 Joseph Abraham
Hobart College
Athletic Department
Geneva, New York 14456

Dist. 2 Joseph Abraham
Hobart College
Athletic Department
Geneva, New York 14456

Dist. 3 Otho Davis
Duke University
Athletic Department
Durham, North Carolina 27706

Dist. 4 Lindsy McLean
Board in Control of Intercollegiate Athletics
University of Michigan
Ferry Field—1000 South State St.
Ann Arbor, Michigan 48104

Dist. 5 Charles Bolton
Kearney State College
Athletic Department
Kearney, Nebraska 68847

Dist. 6 James Dodson
Midland High School
Athletic Department
Midland, Texas 79701

Dist. 7 Rod Kimball
Brigham Young University
Department of Athletics
Provo, Utah 84601

Dist. 8 Leo Marty, Trainer
Portland Trail Blazers
Lloyd Building-Lloyd Center
Portland, Oregon 97207

Dist. 9 Steve Moore
Tennessee Technological University
Athletic Department
Cookeville, Tennessee 38501

Dist. 10 Dan Olesevich
Detroit Hockey Club, Inc.
Olympia Stadium
5920 Grand River Avenue
Detroit, Michigan 48208

DIVISION DIRECTORS AND COMMITTEE CHAIRMEN

Division of Professional Service—Gary Delforge, Director
- Research and Injury Committee—Fred Hoover
- Placement Committee—Al Hart

Division of Professional Advancement—William Newell, Director
- Grants and Scholarships Committee—Mike Linkovich
- Professional Education Committee—Sayers "Bud" Miller
- Certification Committee—Lindsy McLean
- Recruitment Committee—Mel Blickenstaff

Division of Information Services—Clyde Stretch, Director
- NATA Journal Committee—Marvin Roberson
- Public Relations Committee—Larry Gardner
- Audio-Visual Aids Committee—Dick Hoover

Division of National Program and Business Affairs—Tom Healion, Director
- National Program Committee—Ed Block, 1971
- Membership Committee—Bruce Melin
- Honor Awards Committee—George Sullivan

What a Trainer Ought To Be

by

Fred L. Allman, Jr., M.D.*

Members of the National Athletic Trainers Association and Guests: I would like to thank you for giving me this opportunity to be your keynote speaker at this—your twentieth annual meeting. It was my pleasure to participate on your program when you were here in Cincinnati in 1963 and I will never forget your very wonderful response. I also am happy that since 1963 I have had the opportunity to meet many more of you personally and to form warm, friendly relationships, which I hope will continue for many years to come.

I want to congratulate each of you for the fine work your organization is doing—to advance, encourage and improve the athletic training profession in all its phases and to promote a better working relationship among those interested in the problems of training.

During the twenty years that have followed the origin of your organization, tremendous progress has been made in the care of our athletes, and you deserve a vote of appreciation for the role you played. It has been said that nothing is done until someone cares. Fortunately, for the athletes of America, you have cared and you have aided others who have also cared.

Although physicians have been interested in sports, games, and exercise since the Greek Olympiads, athletic medicine as a special field of interest is modern in concept. The post of "games physician" is an ancient one, but its responsibilities were limited almost entirely to the care of the injured. We are now well into an era of a tremendous and still-growing interest in all medical aspects of sports, characterized by multiplication of organized professional groups, publications, and conferences devoted to this subject. The effects are being noted favorably, in improved coordination of the efforts of medicine with those of other interested personnel such as yourselves, and in better standards of care for our athletes.

As a result of the study of the prevention of trauma related to sports and the treatment and rehabilitation of them, and as a result of the study of the morphologic, physiologic, biochemical and psychologic adaptations which take place during development of the ability to reach and sustain performance at a maximal and optimal level, the health care of many of our athletes has become the epitome of medicine at its best. Where else have prevention, diagnosis and treatment, and total rehabilitation been more fully developed than among our top athletic teams?

I can think of no other large segment of our population that is as pampered in their health

*Keynote Address, Twentieth Annual Meeting of the National Athletic Trainers Association, Cincinnati, Ohio, June, 1969.

needs as are some of our athletes of today. These boys are given thorough preseason medical examinations. They are then well conditioned, given good, well-fitting equipment, and good playing facilities. They are protected by rules which are made to safeguard their health, urged to maintain good body hygiene, their diets are controlled, and they are always cautioned to report the first sign or symptom of an injury or illness. They are immunized, scrutinized, organized, and whenever necessary are even circumcised. If injury should occur, it often occurs in the presence of one of you or perhaps even in the presence of the team physician, and the nature as well as the extent of the injury are often immediately ascertained. Treatment is based upon promptness, utilization of the best method, avoidance of expediency, and a desire to fully rehabilitate. Cost is not a factor and specialists in all fields of medicine are available should consultation be needed.

I would like to give you a true example that will help emphasize my point.

On Thanksgiving day, the Georgia Freshmen play the Georgia Tech Freshmen in Atlanta. In the fourth quarter of one of the recent games, a defensive back had a tooth knocked out when struck in the mouth by the heel of a shoe while defending on a pass. The player was unconscious initially, but responded promptly. After careful examination, he was carried to the sideline and his tooth wrapped in gauze. A telephone which was available on the bench was utilized to have the team dentist paged over the public address system, who responded immediately. Following a shower, the injured athlete was taken to a well-equipped office where a second dentist, a specialist in root canal work, was called and the tooth was replaced. By 7:30 p.m. Thanksgiving night, this young athlete was at home in South Georgia, spending the holidays with his family—the tooth safely restored.

Needless to say, few bank presidents, or other affluent individuals, could have received such "blue ribbon" treatment by a root canal specialist on Thanksgiving day.

As a result of this "super-care", these young athletes have developed positive ideas regarding health. Thus, sports serve as a medium for developing desirable attitudes and behavior that contribute to their health, both immediate and in the future.

Think, if you will, for a moment, the impact upon the economy, the strength and the vitality of a nation, should all of its citizens have such a positive attitude concerning their health.

Unfortunately, all of our citizens and many of our athletes do not receive this type of "blue ribbon" treatment and it must stand as a challenge to your profession and to mine to see that all athletes will someday soon be included in this premium group.

For the next few minutes, I would like to talk with you about what you as a trainer ought to be, for if we are to discover our strengths and improve our weakness we must periodically undergo self-evaluation.

First and foremost, as a member of the paramedical team, the trainer must have *compassion* —a feeling of sorrow or pity for the suffering or misfortunes of others. He views the healing function as a human relationship and understands the trainer-athlete relationship to be one which involves both scientific understanding and sympathetic rapport. He recognizes the athlete as a person with a spiritual birthright whose substance is far greater than the mere sum of his material components.

The trainer has *understanding* and an awareness of the separate but interrelated facets of the body, mind and the spirit, and realizes the importance of symmetrical maturation of these facets.

He has *sincerity, honor* and *integrity,* and has learned in the words of Shakespeare, "to thine own self be true". He is himself. He doesn't try to copy someone else's style, and doesn't try to imitate another's success. He doesn't try to be something other than what he truly is. By being himself, he maintains his own artistic integrity and preserves his personal integrity. But integrity means even more—it means being completely true to what is inside of you, to what you know is right. It means doing what you feel you must do regardless of immediate cost or sacrifice. It means making decisions for yourself, both now and for your entire life, based upon what is proper, not on what is expedient. It means at all times to be honorable and to behave decently. It means being intellectually honest.

Without integrity, no person is complete.

Without integrity, nothing done has any real value.

The ideal trainer strives for *perfection* and *excellence* and will not tolerate mediocrity, especially in himself. He realizes that all men are not created intellectually equal and that mental tests may tell how far an individual has come in certain kinds of ability; but no test, except life itself, can tell how far he can go.

The trainer is a *leader*. He realizes that leadership is something that can only be learned by facing successfully its demand upon the individual's total capability. He also realizes that there is no inherent good in athletic competition—that the good or bad depends upon the leadership and organizational structure and that the vision of every youth leader must go beyond developing skills and winning games for the really important thing is what happens to the boy or girl in the process.

The trainer has *determination* and *perseverance*. His reach exceeds his grasp. He knows the satisfaction of doing his best, the joy of excelling, the wonderful feeling of completing the job and looking back on it knowing that he has done his best. He finds encouragement in verses 3-5, the fifth chapter of Romans, "We rejoice in our sufferings, knowing that suffering produces endurance, and endurance produces character, and character produces hope, and hope does not disappoint us".

The trainer has an insatiable *thirst for knowledge*. He knows his subject and does his homework. He vigorously seeks total knowledge in his subject area for he realizes that his knowledge might someday mean the difference between life and death.

Maimonides stated, "May there never develop in me the notion that my education is complete but give me the strength and leisure and zeal continually to enlarge my knowledge".

The trainer is an *enthusiastic* person who has a zest for life and lives fully. He is energetic and on the move for he realizes that aimless drifting wastes energy and causes painful collisions. He is fully aware that the full use of today is the best preparation for tomorrow, and that nothing is ever achieved without enthusiasm.

He understands that *self-reliance* enables him to help himself and to be less dependent on others, and that responsibilities and character-building activities help to develop self-reliance and that courage is built on self-reliance.

He has *courage* or tenacity of purpose—the quality of mind which enables him to meet danger and difficulties with firmness, valor and boldness.

Captain Eddie Rickenbacker, World War I flying ace, called courage, combined with opportunity and the incentive to forge ahead, the ingredients that made American the great nation that it is today.

And Toynbee tells us that civilizations flourish or fade depending upon the creativity and the courage with which successive generations meet the challenges which arise to test them, and the same is true of organizations such as yours, as well as for nations.

Teddy Roosevelt said, "We cannot afford to turn out men who shrink from physical effort or from a little physical pain. In any republic, courage is a prime necessity for the average citizen if he is to be a good citizen, and he needs physical courage that endures, and courage that will fight valiantly against the foes of the soul and the foes of the body". Yes, we need this type courage in our athletes, and if they are to have it, it must be present in our trainers and coaches.

The trainer displays *self-discipline* and *self-control*. He realizes that everything a man does throughout life requires the personal imposition of self-discipline. The greater the responsibility, the more demanding the discipline. Self-discipline is not inherited. It is acquired by the acceptance of small responsibilities each step of the way. It is only when all the responsibilities, accepted and discharged, are totaled up that we realize that small things are important things, and that they are the stuff of which character is made. Self-discipline enables the trainer to organize his time and activities and to channel his enthusiasm into productive activities.

A good trainer is *versatile*. He does many things well. He is an articulate speaker with the ability to communicate with verbal skill and competence. He laughs easily, and realizes that there is no other personal charm as great as the charm of cheerful temperament. He is *sensitive* and highly tuned to life around him, and the gateway to his mind is always open. He has evenness of mind and temper with the strength to accept the trails of life and rise superior to them. Like Ben Franklin, he believes that politeness to superiors is duty, to equals courtesy, to inferiors nobleness.

His *judgment* is sound for he searches for facts, evaluates them, and tries to first understand before he judges. He is pliable and resilient, not rigid in his thinking.

He is *responsible* and recognizes that with every privilege in life there goes an obligation and a responsibility. J. C. Penney has rightfully said, "Man is the architect of his own future", and Shakespeare has similarly stated, "Our remedies in ourselves do lie, which we ascribe to Heaven". Luck is a matter of being prepared when the opportunity presents itself. It is the work of preparing that usually creates the opportunity. By your choice you alone control the course of your life. It is your responsibility to see that you choose the right course.

A trainer must also be a *responsible citizen*.

He is informed and interested in government at all levels, for he realizes that our nation will stand or fall, depending directly on the acceptance of a responsible citizenry that willingly informs itself and meets its obligations on the basis of information and resulting wisdom. He believes that as an individual informed and interested in government he is capable of inducing change. He further realizes that before you destroy one thing, you should be prepared to build something better, and before you plan how to demolish the existing institutions that you should try to perfect your plans for rebuilding them.

A good trainer safeguards his own *health,* for he is aware that good health, generated by physical fitness, is the logical starting point for the pursuit of excellence in any field. He knows that physical vitality promotes mental vitality and thus is essential to success and achievement.

The good trainer knows the meaning of *love.* He encourages such a relationship not only for God, family, and country, but also for his work, his fellow associates, and his profession.

The trainer seeks *greatness.* The late Dag Hammerskjold cautioned, "Never measure the height of a mountain until you have reached the top. Then you will see how low it was". The same is true of greatness, for many times it is found that early or initial ideas of greatness are really very shallow. True greatness is often hard to define and even more difficult to achieve.

Too often we think of greatness in terms of our material possessions. Yet, life has a way of saying to us that not all people who are extremely wealthy in material things are wealthy otherwise. One may be rich in things and poor in soul.

In 1923, a very important meeting of ten of the most successful financiers in the world was held at the Edgewater Beach Hotel in Chicago. I'm sure that all of the men present were considered by many of their associates, and perhaps by themselves, to have achieved greatness. Those present were: The president of the largest independent steel company, the president of the National City Bank, the president of the largest utility company, the president of the largest gas company, the greatest wheat speculator, the president of the New York Stock Exchange, a member of the President's Cabinet, the greatest "bear" on Wall Street, head of the world's greatest monopoly, president of the Bank of International Settlements.

Certainly we must admit that there were gathered a group of the world's most successful men. At least they were men who had found the secret of making money. But what of these men twenty-six years later.

The president of the largest independent steel company, Charles Schwab, died bankrupt and lived on borrowed money for five years before his death.

The president of the greatest utility company, Samuel Insull, died a fugitive from justice and penniless in a foreign land.

The president of the largest gas company, Howard Hobson, is now insane.

The greatest wheat speculator, Arthur Cutton, died abroad insolvent.

The president of the New York Stock Exchange, Richard Whitney, was recently released from Sing Sing Penitentiary.

The member of the President's Cabinet, Albert Fall, was pardoned from prison so he could go home to die.

The greatest "bear" on Wall Street, Jesse Livemore, died a suicide.

The head of the greatest monopoly, Ivor Krueger, died a suicide.

The president of the Bank of International Settlements, Leon Fraser, died a suicide.

All these men learned well the art of making money but apparently not one of them learned how to live or why to live.

Most of you, as long as you remain athletic trainers, are not likely to accumulate vast amounts of material wealth; however, you will be given the opportunity to accumulate the kind of wealth that Jesus referred to in his Sermon on the Mount when he said, "Provide for yourselves purses that never wear out, a treasure inexhaustible in the heaven".

Please allow me to take a few minutes to examine the way you might go about accumulating these purses that never wear out.

First, you are rich in proportion to what you have given to life. Selfishness has a way of corroding the spirit and destroying inner peace, eventually leading to collapse. That which really gives satisfaction is the ability to look back upon those moments when we have risen above self aggrandizement and have given of self to some worthy effort in life. Almost daily, in your contacts with young athletes, you are given the opportunity to offer much to their life, and in so doing to enrich your own.

Secondly, you are rich if you have lived for some great purpose. If, like Pau, you can say, "I have fought a good fight. I have finished the course. I have kept the faith", then you are rich.

John Wesley is reported to have made a great deal of money but he never kept any of it. He said, "I get it out of my hands as quickly as I can,

lest it find its way into my heart". He was once investigated by the tax experts. They came to him and said, "Why don't you pay taxes?" Wesley replied, "I don't have anything to pay. I don't have anything except a few silver spoons and the clothing that I wear". It is said of him that when he died he left a worn-out preacher's cloak, a greatly used Bible, a badly abused reputation, and the Methodist Church. That is all he had to leave the world, but what a legacy it was! Carlyle has said, "Have a purpose in life, and having it, throw into your work such strength of mind and muscles as God has given you".

Thirdly, you are rich also if you can enjoy the simple things in life. Life today has become very complex and we are constantly "brain-washed" by the advertising media into believing that we must drive such and such an automobile, live in a house that has all of the available conveniences, wear the latest styles, and take a pill to wake us up, another to keep us tranquil during the day, one to counteract the acid, another to aid the enzymes, something to avoid constipation the first of the week and something for diarrhea the end of the week, and still another pill to help us sleep at night. Because of the complexity of living, we have forgotten or overlooked the simple things. We seldom have time to enjoy the marvels of nature, seldom seek the cause of disease and tensions, and seldom if ever allow ourselves to really evaluate our true selves.

Astronaut James Lovell upon his recent return from the moon flight was asked if his philosophy had changed any since his trip. His answer was, "Yes, it has changed. From 240,000 miles out in space you can completely cover the earth with the end of your thumb, and as you look about the entire universe you realize how vast it is, how small the earth is, and all of a sudden all of the problems on earth appear very small and unimportant". Therefore, I would like to urge you to seek happiness in the simple things and seek to help those about you to enjoy them.

And lastly, but most important, you are rich if you live and die by faith in Jesus Christ.

Sir William Osley has said, "Nothing in life is more wonderful than faith. It is the one great moving force which we can neither weigh in the balance nor test in the crucible".

I hope that each of you trainers gathered here today have faith in yourself, faith in your profession, faith in your fellow man, and faith in God.

As Lindsey McLean recently remarked in the Spring issue of your *Journal,* "Athletic training still has a long way to go if it is to become the profession that most of us hope it will". Education, certification, a full time Executive Director, internal scrutiny of morals and ethical behavior, improved communication, the need for workshops, improved trainer, physician, coach relationship, and the need for a Central Placement Bureau are just a few of the future goals recently noted by your Executive Secretary, Jack Rockwell.

Frank O'Connor, the Irish writer, tells in one of his books how he and his boyhood friends would make their way across the countryside, and when they came to an orchard wall that seemed too high to climb, too doubtful to try, too difficult to permit their journey to continue, they took off their caps and tossed them over the wall, and then they had no choice but to follow them.

You gentlemen, gathered here in Cincinnati this week, have already tossed your cap over the wall. Whatever the difficulties, they must be overcome, for you constitute a very vital segment of the medical team that must safeguard the health and vitality, the very life of our athletes.

It is not enough that you be proud of your profession but rather you should make certain that your profession is proud of you.

Not all of you fulfill every quality that I have mentioned today but I hope that you will all try. Remember that as James Lane Allen has said, "The vision that you glorify in your mind, the ideal that you enthrone in your heart—this you will build your life by. This you will become. Thought and character are one. Good thoughts bear good fruit. The higher a man lifts his thoughts, the greater his achievement. Cherish your dreams and ideals. Keep your goal forever in your mind, for as a man thinketh so is he".

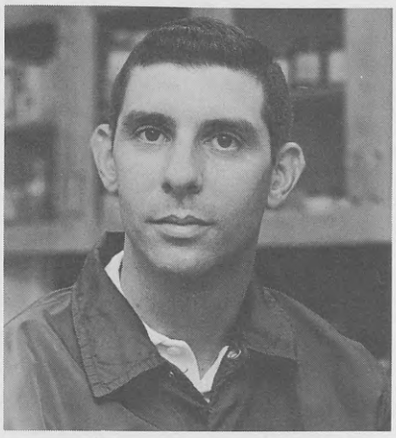
I hope that as each of you return to your home this week, you will reevaluate yourself and try to be the kind of person and trainer that I know you are capable of being. Further, I hope that each of you, because of something said today, or something learned during the remainder of this program or through conversation at the social gathering, will have the pride to stand a little straighter, the character to walk a little taller, the strength to climb a little higher, the desire to think a little purer, the wisdom to act a little wiser, and the motivation to try and be better in every way. It has been a pleasure being with you and, again, I would like to thank you for the opportunity you have given me to be your keynote speaker. I look forward to a continued close relationship with your organization for many years to come for I feel most sincerely you include among your members some of the finest people that I have ever known.

A METHOD OF DETERMINING OPTIMUM WEIGHT FOR FOOTBALL PLAYERS

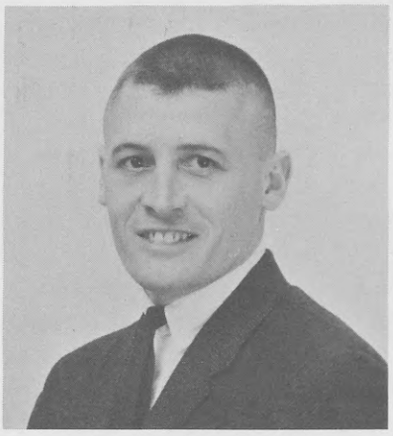
by
Frederick C. Hagerman
Assistant Professor
Department of Zoology
Ohio University
Athens, Ohio

and

Alan W. Hart
Head Athletic Trainer
Department of Intercollegiate Athletics
Ohio University
Athens, Ohio



Alan W. Hart



Frederick C. Hagerman

Most football coaches require players to report for early September practice at a predetermined weight. Methods of choosing this weight vary considerably and may have no actual scientific basis. The coach usually selects a weight for a player based on either his assigned position or his performance the previous season at a seemingly desirable weight. Allowances are seldom made for acute weight losses due to increases in temperature and humidity and an increase in metabolism as energy expenditure is raised. Scale weight is generally associated with height or vaguely defined body build indices. Even if body weight is determined in reference to general skeletal size—slight, medium, or heavy, this is a poor measure of excess weight or fatness (23, 24, 25, 37). Evaluation of fatness for the football player has been based almost exclusively on an individual's deviation from some standard reference weight for sex, age, and height (36). In fact, this reference once classified and probably still classifies professional football players inaccurately in the obesity category of major life insurance companies, thus making them high risk policy holders or even placing them on the unaccepted list.

Welham and Behnke (36) evaluated the specific gravity and body fat of professional football players and found that although these athletes appeared overweight, they were not obese. They reported that most football players were thin in the sense of having a low fat content of the body, although their average body weight was 24.6 per cent above the U.S. Army's standard that denotes obesity. The size of most football players today presents an erroneous impression of obesity to the uninformed person. However, an impression of obesity is not entirely without foundation since some professional football players allow themselves to add excessive fat tissue in the off-season, or on their retirement gain many pounds of fat. The average person views these examples as representative. In both instances it is simply a matter of caloric input and output. During the season their voracious appetites and eating habits are offset with the utilization of

large amounts of energy. After the season ends many players continue to eat in a fashion to promote and sustain high energy outputs but end exertion abruptly, the net result being the addition of excess fat.

Several studies have reported findings following analysis of body composition. The methods of assessment varied, but the most reliable and valid estimates made use of body density (specific gravity). Some workers have developed multiple regression equations for estimating body density from skinfold measurements (10, 29, 33, 34, 38). Probably the most accurate methods of assessment are those involving measurement of lean body mass by underwater weighing techniques (20, 21, 22, 23, 30, 36) or with chemical methods (1, 7, 8, 11, 12, 14, 18, 19, 26, 27, 28, 31, 32, 25). Although more accurate, these techniques are not compatible with a large group of subjects. Anthropometric data (2, 3, 4, 5, 6, 15, 2, 36, 37) and skin fold measurements (9, 16, 17, 21, 25, 29) have been used extensively and offer the investigator simple, inexpensive and valid research tools to quantitatively estimate body compositions of a large group. Although skin fold measurements were thought to slightly overestimate body fat, it has been reported that they are very reliable (23). A recent study has shown anthropometric and skinfold results to correlate significantly with underwater weighing (37).

METHODS

At the request of Ohio University football coaches and with assistance from the athletic training room staff, specific gravity and percentage of fat were determined for each player by skinfold and anthropometric measurements. Members of the freshman and varsity teams were first studied at the end of spring practice, 1968, and body composition variables have been subsequently recorded prior to Fall, and after Springdrills since that time.

Skinfold measurements. A Lange Skinfold Caliper (Cambridge Scientific Industries, Cambridge, Maryland) with a constant jaw tension of 10 gm/mm^2 was utilized to take the skinfold measurements. All measures were made on the right side of the body by grasping the skinfolds between the thumb and index finger. The skinfold inspected included two thicknesses of skin and subcutaneous fat, but not muscle or fascia. If there was some question as to whether there was musculature contained within the fold, the subject was asked to contract the underlying muscle group so that a differentiation could be made. The parallel jaws of the caliper were applied about 1 cm. from the fingers holding the skinfold at a depth approximately the thickness of the fold. All measurements were taken in the vertical plane except when the natural contour of the fold dictated otherwise. The skin surface of each subject was towelled dry prior to collection of data and this dryness was insured throughout testing. According to Keys and Brozek (23), skinfold testing is most reliable when the subject is in a post-absorptive state but measurements are still highly dependable if they are repeatedly taken at a consistent time of day with the subject in a normal hydrated condition. Procedures of this study satisfied the latter requirements. Normal hydration was checked by comparing pre- and post-practice scale weights.

The measurements adopted for this study agreed with those recommended by Brozek and Keys (10), Committee on Nutritional Anthropometry of the Food and Nutrition Board, National Research Council (13), and Pascale et al. (29), and included the following sites:

A. Chest, mid-axillary: at nipple level just under right axillary area (in cm.).

B. Chest, mid-clavicular: immediately right of right nipple (in mm. and cm.)

C. Posterior arm, triceps: back of upper right arm over triceps muscle, at a point half-way between tip of acromion process of scapula and olecranon process of ulna, elbow flexed at 90° and muscles relaxed (in mm.).

D. anterior arm, biceps: front of upper right arm over biceps muscle, at a point half-way between tip of acromion process of scapula and olecranon process of ulna, elbow flexed at 90° and muscles relaxed (in mm.).

E. Back, subscapular: at the inferior angle of right scapula (in mm.).

F. Abdomen, umbilicus: 1 cm. to right of umbilicus and parallel to longitudinal axis of body (in mm.).

G. Waist, supra-iliac: right mid-axillary line above crest of ilium (in mm.).

H. Anterior thigh, quadriceps: front of upper right leg over rectus femoris muscle, at a point half-way between greater trochanter and condyles of femur, knee joint flexed slightly with weight on left leg (in mm.).

I. Body weight: (in kilograms)

These measurements were combined into specific gravity and per cent fat quantities (10, 13, 29, 30).

1. Specific Gravity = 1.1017 − 0.000282 × (abdomen measurement (F.) at umbilicus in mm.) − 0.00736 × (chest measurement (B.), mid-clavicular in mm.) − 0.000883 × (anterior arm measurement (D.) in mm.)

2. Specific Gravity = 1.1125 — 0.000292 × (abdomen measurement (F.) at umbilicus in mm.) — 0.000661 × (chest measurement (B.), mid-clavicular in mm.) — 0.000181 × (back, subscapular measurement (E.) in mm.) — 0.000711 × (anterior arm measurement (D.) in mm.) — 0.000375 × (anterior thigh measurement (H.) in mm.) — 0.000122 × (body weight in kg.)

3. Specific Gravity = 1.08012 — 0.007123 × (chest measurement (A.) mid-axillary in cm.) — 0.004834 × (chest measurement (B.), mid-clavicular in cm.) — 0.005513 × (posterior arm measurement (C.) in cm.)

4. Per Cent Fat (room air temperature, 20° C.) = 100 (5.548/sp. gr.) — 5.044

5. Per Cent Fat = 5.783 + (.153 × back measurement (E.), subscapular in mm. + abdomen measurement (F.), umbilicus in mm. + waist measurement (G.), suprailiac in mm. + anterior thigh measurement (H.) in mm.)

Anthropometric Measurement. Girth measurements were made at selected anatomical sites in order to determine per cent of excess body fat. The procedure was that proposed by Behnke, Brodsky, and Guttentag (4).

Lufkin Pocket Linen Tapes (1.5m, model 3175 ME) were used to measure circumferences. The tape was drawn firmly but not tightly, around the structure to be measured and the circumference recorded in centimeters. Care was taken to allow the tape to conform to the natural contour of the body part. In the case of extremity testing, both right and left portions were measured and then averaged to yield a composite bisymmetrical value. Circumferential measures were taken at the following sites:

A Group:

1. Buttocks: On a plane to cover middle of buttocks around lower waist just above genital area.

2. Thigh: Around thigh and on a plane with gluteal fold, quadriceps muscle relaxed.

3. Abdomen: On a plane midway between lowest margins of last ribs laterally and superior margins of iliac crests.

B Group:

1. Chest *: Tape drawn fully around body at nipple level and measurements taken at maximal inspiration and expiration and then these values averaged to produce required value.

2. Shoulder **: Maximal circumference of shoulder with tape drawn around upper arm at a point just under axilla with humerus abducted to horizontal and elbow flexed, biceps firmly contracted.

3. Forearm: Maximal circumference, arm extended anteriorly and hand open.

4. Wrist: Minimal circumference, immediately proximal to styloid processes of radius and ulna.

5. Knee: Tape drawn on a line across middle of patella and around middle of popliteal space with knee slightly flexed to relax patella.

6. Calf: Maximal circumference of gastrocnemius and anterior area of tibia, standing flat-footed.

7. Ankle: Minimal circumference, on a line immediately above medial and lateral malleoli.

Circumference values were combined with height (in cm.) and weight (in kg.) in a series of computations, utilizing a pre-determined per cent of body fat standard, to yield excess body fat in kg. (4).

Utilizing the recommended equations, skinfold and anthropometric data were computerized by a program specifically designed for this study on an IBM 360-44 computer. Program results produced five values for each subject: 1., per cent body fat; 2., Excess body fat, in kg.; and 3., 4., and 5., specific gravity figures which in turn were converted to yield per cent body fat. The average of these values represented per cent body fat for each subject.

RESULTS AND DISCUSSION

The measuring techniques and subsequent reduction of data involved relatively uncomplicated procedures and are highly reliable and objective. Probably the greatest single advantage of these methods is the time factor. They permit body composition assessment of a large group in a fairly short period of time, each subject requiring approximately 8-10 minutes for evaluation. The measurements for both skinfold and anthropometric variables have shown a high degree of consistency since beginning the tests in May, 1968. Reliability coefficients when comparing a total of four evaluations for each subject (Spring and Fall, 1968 and Spring and Fall, 1969) ranged from .891 to .933. After comparing the results of the five computations it was noted that specific gravity formula number 3., per cent fat formula (number 4), and excess body fat in kg. correlated to a high degree and rendered com-

* When chest circumference exceeds that of abdomen then chest variable is placed in B Group otherwise it remains in A Group.

** If the bideltoid measurement cannot be made because of a lack of the specialized measuring device used to evaluate this variable, then shoulder circumference is the recommended substitute.

parable data with other similar studies, while specific gravity formulas, Numbers 1 and 2 tended to slightly underestimate percent body fat.

The three multiple regression equations yield body density information and then each easily can be converted to percent of body fat. The fourth skinfold formula involves direct calculation of percent fat. The anthropometric dimensions, after recommended computations, produce excess fat results in kg. utilizing scale weight and compared with a predetermined standard. A specific gravity of 1.060 has previously been selected as a tentative dividing line between obese and non-obese individuals (36). This figure is equal to 19.0 percent body fat (30) or approximately 27 pounds of lipid tissue and also represents the accepted norm for U.S. males. The use of 1.060 sp. gr. or 19 percent as a standard may not be applicable for athletes. The mean specific gravity, percent fat, and excess fat for specific team positions have been used by us as the standards for determining an excess of body fat. Percent of body fat has ranged from 7-27 in our studies with the mean for backs being 10 percent and for interior lineman, 15 percent. Various positions require individuals with certain specific skills and sometimes selected anatomical characteristics place certain limitations upon performance in these positions. As long as the coach's basic offensive and defensive positions and assignments remain the same, the averages for each position can be compared from one evaluation to the next. Excess fat (in kg.) as determined by the anthropometric method was regulated by using percent fat averages for each playing position as designated by the coaches. In other words, if the average percent fat reported for defensive linebackers was 15.0 percent, then excess fat (in kg.) was determined by using 15.0 percent as the comparative standard.

After the player's body fat and excess fat have been estimated in the spring, he is told personally by the coaches at what weight he should report in September. If necessary, the team physician provides dietary consultation.

This method for estimating body fat helps to eliminate some of the emotional entanglements which often occur when the coach is dealing with a player's weight problem. If the athlete is a known "loafer" and appears from the coach's subjective estimate to be a little overweight, the coach may ask the player to report below his optimum weight. This request comes about more as a matter of discipline than as a scientifically based evaluation and in reality may put the athlete at a physical disadvantage before practice ever begins. On the other hand, an outstanding player who has always worked hard and performed well may be actually playing above his optimum weight but because of his performance little or no thought is given to his weight. It is possible that he could be even better by playing without excess fat. We are not purporting that these measurements should be the sole basis of selecting individuals for certain positions or that there are no limitations to these methods, particularly if one considers unique and important individual differences.

These tests, however, permit the coach to gain a general insight as to what typical fat percents represent certain positions, to accurately estimate excess body fat in the player, and also to look for extremes in percent body fat, particularly in those subjects who are in the 20-24 percent body fat range. So far it has been shown that these people, if the condition is not rectified, play very little and therefore become risks for the coaches in continuing to work with them. We also use extensively, as bases for norms, the percent fat of those players who are or have been the better performers at a particular position, attempting to correlate a successful performance with body composition.

Fat test results have been very helpful to the trainer and team physician. We have been able to note areas of muscular weakness by simply comparing certain bisymmetrical linear measurements and as a result, have begun immediate remedial exercises for the area in question. We have also accomplished better physical conditioning since prior knowledge of proper playing weight, and additional off-season dietary and conditioning information have prompted a more sensible and deliberate approach to achieving desired scale weight. Since beginning testing, injuries and fatigue associated with overweight have been significantly reduced. A detrimental physiological sequence of events involving strength decrement, muscular soreness, and general fatigue, found among those players who previously lost large amounts of weight acutely just prior to the beginning of fall practice, has practically been eliminated.

We believe that this kind of cooperation, between researcher, trainer, team physician, and coaching staff, will provide better care for the athlete and help to improve his performance. Scientific evaluation of body composition not only insures that each athlete is participating at an optimum weight but these tests also appeared to have a positive psychological effect upon team members.

In the first place a new and unique approach

was attempted with the players. It was not just the coach reiterating the value of losing weight and then arriving at some seemingly desirable figure. Now it was the same coach armed with more objective information based on carefully constructed testing and thus better prepared to discuss weight problems with his players. Secondly, testing procedures and results, and player consultations have made each athlete more aware of his individual importance to a team effort and because each is assigned a specific weight, based on scientific testing, they become more cognizant of the significance of achieving a desirable playing weight. We are hopeful that in addition to their objective value, these tests have promoted cohesiveness and harmony, both of which are necessary to insure outstanding team efforts.

REFERENCES

1. Allen, T. H. Extraction of T-1824 in the presence of gross hemolysis and lipemia. *Proc. soc. exper. biol. and med.* 76:145-147, 1951.
2. Behnke, A. R. The estimation of lean body weight from "skeletal" measurements. *Human biol.* 31:295-315, 1959.
3. Behnke, A. R. Quantitative assessment of body build. *J. appl. physiol.* 16:960-968, 1961.
4. Behnke, A. R., Brodsky, C., and Guttentag, O. E. Quantification of body weight and configuration from anthropometric measurements. *Hum. biol.* 31:213-234, 1959.
5. Behnke, A. R., and Hechter, H. The relationship between weight and some anthropometric measurements in adult males. *Hum. biol.* 31:235-243, 1959.
6. Behnke, A. R., and Royce, J. Body size, shape, and composition of several types of athletes. *J. sports med. phys. fitness.* 6:75-88, 1966.
7. Best, W. R., Kuhl, W. J., Jr., and Consolazio, C. F. Relationship of creatinine coefficient to leanness-fatness in man. *J. lab. and clin. med.* 42:784, 1953.
8. Bowler, R. G. The determination of thiocyanate in blood serum. *Biochem. j.* 38:385-388, 1944.
9. Brozek, J., Brock, J. F., Fidanza, F., and Keys, A. Skinfold caliper estimation of body fat and nutritional status. *Fed. proc.* 13:19, 1954.
10. Brozek, J., and Keys, A. The evaluation of leanness-fatness in man: norms and interrelationships. *Brit. j. nutr.* 5:194-206, 1951.
11. Campbell, T. J., Frokman, B., and Reeve, E. B. A simple, rapid, and accurate method of extracting T-1824 from plasma, adapted to the routine measurement of blood volume. *J. lab. and clin. med.* 52:768-777, 1958.
12. Cardozo, R. H., and Edelman, I. S. The volume of distribution of sodium thiosulfate as a measure of the extracellular fluid space. *J. clin. invest.* 31:280-290, 1952.
13. Committee on Nutritional Anthropometry of the Food and Nutrition Board, National Research Council. *Body measurements of human nutrition.* Detroit: Wayne University Press, 1956.
14. Consolazio, C. F., Johnson, R. E., and Pecora, L. J. *Physiological Measurements of Metabolic Functions in Man.* New York: McGraw-Hill Book Company, Inc., 1963, pp. 255-310.
15. Damon, A., and Goldman, R. F. Predicting fat from body measurements; densiometric validation of ten anthropometric equations. *Hum. biol.* 36:32-44, 1964.
16. Durnin, J. V. G. A. The influence of nutrition. *Can. med. assoc. j.* 96:715-718, 1967.
17. Durnin, J. V. G. A., and Rahaman, M. M. The assessment of the amount of fat in the human body from measurements of skinfold thickness. *Brit. j. nutr.* 21:681-689, 1967.
18. Faller, I. L., Bond, E. E., Petty, D., and Pascale, L. R. The use of urinary deuterium oxide concentrations in a simple method for measuring total body water. *J. lab. and clin. med.* 45:759-764, 1955.
19. Frank, H. A., and Carr, M. H. A simplified method for estimation of the extracellular fluid space. *J. lab. and clin. med.* 45:973-976, 1955.
20. Howell, M. L., Moncrieff, J., and Morford, W. R. Relationship between human buoyancy measures, specific gravity, and estimated body fat in adult males. *Res. quart.* 30:400-404, 1962.
22. Katch, F. I., Michael, E. D., Jr., and Horvath, S. M. Estimation of body volume by underwater weighing: description of a simple method. *J. appl. physiol.* 23:811-813, 1967.
23. Keys, A., and Brozek, J. Body fat in adult man. *Physiol. rev.* 33:245-325, 1953.
24. Mayer, J., and Thomas, D. W. Regulation of food intake and obesity. *Science* 156:328-337, 1967.
25. McArdle, William D. Evaluation of body composition. *Physical educator,* March, 1969, 26-27.
26. Miller, A. T., Jr., and Blyth, C. S. Estimation of lean body mass and body fat from basal oxygen consumption and creatinine excretion. *J. appl. physiol.* 5:73-78, 1952.
27. Moore, F. D. Determination of total body water and solids with isotopes. *Science.* 104:157-160, 1946.
28. Moore, F. D., McMurrey, J. D., Parker, H. V., and Magnus, I. C. Body composition. Total body water and electrolytes: Intravascular and extravascular phase volumes. *Metabolism.* 5:447-467, 1956.
29. Pascale, L. R., Grossman, M. I., Sloane, H. S., and Frankel, T. Correlations between thickness of skinfolds and body density in 88 soldiers. *Human biol.* 28:165-176, 1956.
30. Rathbun, E. N., and Pace, N. Studies on body composition: I. The determination of total body fat by means of the body specific gravity. *J. biol. chem.* 158:667-676, 1945.
31. Root, W. S., Raughton, F. J. W., and Gregersen, M. I. Simultaneous determinations of blood volume by CO and dye (T-1824) under various conditions. *Am. j. physiol.* 146:739-755, 1946.
32. Schloerb, P. R., Friis-Hansen, B. J., Edelman, I. S., Solomon, A. K., and Moore, F. D. The measurement of total body water in the human subject by deuterium oxide dilution. *J. clin. invest.* 29:1296-1310, 1950.
33. Sloan, A. W. Estimation of body fat in young men. *J. appl. physiol.* 23:311-315, 1967.
34. Sloan, A. W., Burt, J. J., and Blyth, C. S. Estimation of body fat in young women. *J. appl. physiol.* 17:967-970, 1962.
35. Walser, M., Seldin, D. W., and Grollman, A. An evaluation of radiosulfate for the determination of the volume of extracellular fluid in man and dogs. *J. clin. invest.* 32:299-311, April, 1953.
36. Welham, W. C., and Behnke, A. R., Jr. The specific gravity of healthy men. Body weight÷volume and other physical characteristics of exceptional athletes and of naval personnel. *J.A.M.A.* 118:498-501, 1942.
37. Wilmore, J. H., and Behnke, A. R. Predictability of lean body weight through anthropometric assessment in college men. *J. appl. physiol.* 25 (4):349-355, 1968.
38. Young, C. M., Martin, M. E. K., Tensuan, R., and Blondin, J. Predicting specific gravity and body fatness in young women. *J. am. dietet. assoc.* 40:102-107, 1962.

Contributions Of Athletic Trainers To Human Dignity

by
Jim Bryan, Athletic Trainer*
Columbia University
New York, N.Y.

There is today, as in other times and other places, a reflection through diverse actions, of man's basic need for dignity. Human dignity is not solely a political concept; it has as much to do with the individual's personal rights as with the collective generalized constitutional guarantees.

People are not fit subjects for exploitation, whether in terms of their labor, their minds or their bodies. The fact that black people throughout this land are finally rising to defend their personal and collective integrity is a basic element in the present black confrontation with the traditions, laws and policies of white America. It would appear that:

The new business of black America is ceasing to be the subhuman that the Caucasian tried to make him, and the white's new business has become ceasing to be the superman that the subjection of the black man in this country allowed him to think he was.

Historically, blacks have found an opportunity to succeed through the media of athletics and history records many outstanding black athletes in most American sports. Frequently their participation has been limited by racial prejudice, hatred and bigotry as found in our racist society. This desire on the part of black athletes to realize their potential has been used by many individuals to exploit them as well as to increase their own prestige in professional endeavours.

Some black athletes have profited both personally and professionally from participation and subsequent success. Some colleges and universities have profited from the success that talented black athletes have helped them obtain. Some athletic personnel have profited from the success brought about by talented black athletes. However, as in all human endeavours the wedding of athlete, athletic coach, and school has not in all cases been a compatible one.

There are evidences of the exploitation of black athletes. There are further evidences of the ignoring of the academic responsibilities and requirements of the black athlete by his coach. There are evidences of the perpetuation of racial stereotypes by athletic personnel.

The problem at hand would appear to be that regardless of what has transpired, how best can we plan for and bring into actuality athletic programs with respect for the integrity of the individual personality, regardless of his racial identity and or athletic abilities.

There needs to be a concerted effort to bring us together as people rather than alienate us as ethnic identifications. This would necessitate a greater effort on the part of the athletic trainer and coaches to understand the young ethnic minority group athlete.

A NEW BREED

The black athlete as found in secondary schools, colleges, and universities today is a new breed of man. He is aware of his blackness. This black consciousness is emphasized in various ways; hair styling, clothing, language, the demand for black studies, the emphasis upon black history, and other remnants of an African past. Black in America becomes an attitude, a state of mind and a way of looking at contemporary social life. Any athletic trainer or coach who fails to be cognizant of this new identity is subjecting himself and his program to the possibility of confrontation. The thinking that prevails in some athletic circles, that because you brought an athlete to your school and he is on some type of financial aid and that he must acquiesce to all your demands regardless of how fair or unfair they may be is not compatible with this newer attitude of black awareness.

The black athlete just as all other athletes is immediately concerned with those attitudes and behavior that are in his best personal interest as well as in the interest of blacks collectively. This

*Presented at the 21st Annual Meeting of the National Athletic Trainers Association, Denver, Colorado, June, 1970.

has given rise to many personal confrontations and hurt feelings on the part of athletes, coaches, and trainers. This degree of sensitivity as manifested by many ethnic minority group athletes is new to many of us in the profession. There are many more values that we have traditionally overlooked which are implicit in the things we do professionally. The respect for integrity of the individual, the respect for differences of opinions and attitudes, the respect for the desires, interest, and needs of all men find a dominant place in the affairs of our professional pursuits.

It would appear that as times have changed, and that as attitudes have changed, and as relationships have changed, our attitudes would subsequently change also.

Black athlete/white coach and trainer confrontations will continue as long as there is the inability to work out jointly the terms on which whites and blacks are to coexist athletically with one another in a world where the power to maintain white supremacy has long since disappeared but where the scars and the debris of a long neglected past still persist. We must actively and collectively work for the perpetuation of human dignity and respect which are facilitated through athletic participation.

And in conclusion, the one rewarding thing that my remarks might include is that there are among us, both black and white, people who believe that needed changes in our society, personal freedom, personal security and human dignity can yet be obtained through the existing structure of our government. We are the ones who believe that men of good will and integrity must engage the system, not withdraw from it. For we have found qualities we can admire in people of all races, religions, and nationalities; among these human qualities are kindness, consideration, generosity, honesty and the nobility of the human spirit, which allows us, in principle as well as in fact to be conceived about our brother and his welfare, realizing that if he hurts, I hurt, and if he is not free, I am enslaved.

Underwater Exercise In Athletic Rehabilitation

by Dennis Aten, R.P.T. Head Trainer, Eastern Illinois University*

Underwater exercise and activity has a value that is well known and established in the world of physical rehabilitation, yet it is rarely discussed or used in athletic training. Some athletic trainers and team physicians believe that there is substantial evidence for its use in athletic rehabilitation.

Track coaches have long utilized the principle of submaximal activity prior to the close of the practice session to allow the metabolites that have built up during heavy activity periods to be dispersed by the circulation to the filtering systems of the body. In the early 1960's, the Air Force Academy attempted to reduce the amount of stiffness and soreness occurring during fall football two-a-day workouts by using a submaximal activity after the morning practice. The Academy football team used informal and recreational underwater play in a swimming pool as the submaximal activity to achieve metabolite removal. In one sense, this was nothing new. Since prehistoric times, man has used movement in water to relieve aches and pains. Through the ages, hydrotherapy has become more sophisticated, but theoretically the primitive idea of exercise in water should still have value in removing waste products. Subjective evaluation indicated that the program was successful in relieving or preventing soreness and stiffness.

Utilizing the principles of range of motion and water resistance exercise, activities were started to aid injured athletes. Although some work initially was done with shoulders and arms, the program was primarily concerned with running in chest level water for relief to lower extremity soft tissue injuries. The running activity required

*Based upon a presentation at the 21st Annual Meeting of the National Athletic Trainers Association, Denver, Colorado, June, 1970.

a muscle pumping action which, along with a marked increase in heart rate, caused an increase in circulation. The water made the activity a resistance exercise, also. Because of the resistance of the water, movement was relatively slow and prevented ballistic motion which might account for further damage to the soft tissues in an already weakened state. Athletes attempted to obtain full range of motion for each joint in the lower extremity during running with an emphasis on the injured area.

Since this activity was given to athletes who were unable to practice, they were encouraged to work hard while running in the water. The question then arose concerning the amount of cardiorespiratory benefit the athlete might gain during such water activity. In controlled study using radiotelemetry on "in-season" athletes at Eastern Illinois University, heart rates of 160 to 190 BPM were found within two minutes after exercise was initiated. These heart rates were sustained for a minimum of six minutes and indications showed that athletes probably could sustain that level of activity for at least fifteen minutes with no obvious signs of unusual distress.

It is felt that inclusion of this type of activity in treatment regimens has been beneficial to athletes not only in the therapeutic sense, but also in the prevention of deconditioning. This type of underwater activity is recommended only as an adjunct to conventional therapeutic measures and not as a replacement.

The values of this program can be described in the following six areas:

1. During the course of the activity, relatively pain free range of motion can be achieved.

2. The physiological principle of body activity developing metabolic heat should apply, especially in the areas of greatest activity.

3. Natural motion and function of the lower extremity is obtained with minimal weight bearing due to the buoyancy of the water.

4. Circulation and the removal of excessive fluids in the injured area is enhanced by the muscular pumping action.

5. The water can act as either an assistive mechanism or a resistive mechanism for exercise.

6. The activity of the program seems to prevent or delay cardiorespiratory "deconditioning."

There are several advantages from incorporating such a program in a treatment regimen. Many athletes may be treated at once, and varied goals may be achieved as indicated in the six values listed previously. After the initial instruction, student trainers can readily supervise the activity.

The actual routine to be followed will vary depending on the trainer's exact goals. Using a little imagination, one could come up with activities in the swimming pool that are enjoyable and recreational while giving active range of motion that involve joints and require most of the body's systems to work at an elevated rate.

Armed with basic physiological principles and guided by concrete evidence which comes through new research, the direction and sophistication of rehabilitation techniques in athletics is limited only by the individual's own enthusiasm and inventiveness.

ACTIVITIES FOR UNDERWATER EXERCISE

A. For lower extremities
   1. Run in chest high water
   2. Pump legs hard
   3. Raise knees at least as high as hips
   4. Arms may be used to help athlete propel himself through the water if desired. Otherwise, we have athletes hold arms out of water. (Hands behind the head seems to be easiest)
   5. Run as hard as possible for 10 minutes (time can be increased for greater workout benefits as athlete becomes "conditioned." Also extra trials or bouts may be attempted). 10 minutes usually allows 30 to 40 widths of a 42 foot wide pool.

B. For upper extremity
   1. Swim for 10 minutes alternation with breast stroke and elementary back stroke
   2. Rest may be taken as needed for poor swimmers—non-swimmers should simulate the swimming motions while walking in chest high water—good swimmers can increase time and pace of swimming

C. For general body stiffness and soreness
   1. Slop around in pool for 5-20 minutes
   2. Get underwater range of motion to all body parts
   3. Races and relays often motivate athletes to increase activities (water basketball, water polo, etc., can also be used)

Evaluating Injuries, Protective Devices and Cryokinetics in Ice Hockey

by

Richard E. Anonsen, M.D. Minneapolis, Minn.*

Hockey is a fast, aggressive, exciting and sometimes violent game. In recent years we have seen a tremendous growth in its popularity in the United States, both as a participant and spectator sport.

Prior to the winter Olympic season of 1967-1968 my interest and experience had been primarily with football injuries. Even though hockey is fast and furious I had not been impressed with the frequency or severity of injuries in hockey as compared to football. This impression was further supported by Thorndike's[15] statistics. My views have been altered however, after personal experiences with hockey injuries the past three years and now I am issuing a challenge to the medical profession to develop a more basic inderstanding of the mechanism, treatment and prevention of hockey injuries. Because of the risks involved to the athlete we as physicians should be seeking ways to reduce them to a minimum. This thought first occurred to me when I entered the locker room of the U. S. Olympic Hockey Team prior to our pre-Olympic trip to Europe in the fall of 1967 and observed the cream of United States hockey players dressing for a workout. I noticed the lack of teeth, the lack of protective helmets, the lack of protective adhesive strapping and the lack of ice for therapy. A variety of archaic forms of elastic strappings and braces were being self-applied for supposed support and protection. Hopefully, we have eliminated these problem areas in football. In hockey we have had some success in the little leagues and high school in some areas but the impetus to bring added safety is destroyed when the younger players see their heroes in college or the National Hockey League performing without available safety equipment such as helmets and mouth guards.

Because hockey injuries cover the gamut of Watson-Jones or O'Donoghue's Treatment of Injuries to Athletes[13], I will limit them to the three most common injuries—lacerations and related trauma to the face, acromioclavicular separations and ligamentous and meniscus injuries to the knee. In addition, a plea will be made for the mandatory use of mouth guards, adequate protective helmets, accurate adhesive strapping of new and old injury sites and finally the use of cryokinetics in the treatment of painful conditions of the musculo skeletal system.

LACERATIONS AND RELATED TRAUMA OF THE FACE

Being struck in the face, an unprotected area, by a six ounce puck traveling at speeds up to eighty miles an hour or by a high, sharp stick, the ice, the boards, or by a sharp skate, accounts for this injury. The result is a contusion, abrasion, laceration or fracture about the broad expanse of facial skin with underlying bone, muscle, nerve and fascia. Ideally these injuries should be treated in the emergency room environment with aseptic technique and available x-ray studies if necessary. The practice of three or four quickly placed interrupted sutures and a hurried return to "save the game" should be condemned. One should assure himself that there is no serious underlying pathology by close attention to symptoms and careful inspection of the wound. If the patient has been unconscious or examination reveals deformity or crepitation, the appropriate x-ray studies should be performed and the player kept under observation for at least twelve hours without resumption of athletic competition.

In treating lacerations, it is important to follow the standard routine of copious irrigation, inspection for damage to contiguous structures such as muscle, nerves, galea, etc. and to do a primary repair with accurate approximation of the skin creases. Ice applied with an elastic pressure dressing immediately after the injury until primary repair is possible will reduce swelling and improve the results. The lacerated area is protected with a contact pad and athletic participation is then permitted. If the laceration is on the forehead or scalp and the galea is involved this must be approximated. Laceration of the eyebrow may involve the supraorbital nerve. This should be repaired primarily to avoid troublesome anesthesia, itching or tenderness. Careful attention to extra ocular movements will prevent missing a blow out fracture to the orbit. Palpation along the zygomatic arch and infraorbital

Presented at the American Medical Association Clinical Sessions on the Medical Aspects of Sports, Denver, Colorado, November 30, 1970.

margin early, prior to inevitable swelling from a crushing blow, will produce evidence of fracture of the malar bone or zygoma. If a contusion, either alone or associated with a laceration, is distinctly fluctuant, aspiration and injection with hyaluronidase followed by application of ice and a pressure dressing will hasten recovery. The face mask worn by most goalies has reduced the incidence of lacerations.

ACROMIO CLAVICULAR SEPARATION

Acromio clavicular separation is the second most common hockey injury. It results from striking the tip of the shoulder against the boards, the ice or another player. The injury usually is the result of the player falling on the outstretched hand or flexed elbow with the arm flexed forward 990 degrees and in a neutral lateral position. In this position the humerus drives against the glenoid and acromion, pushing them forcibly backward, while the clavicle remains forward, thus stress is applied upon the acromioclavicular and coracoclavicular ligaments. The injury may vary from a simple contusion or subperiosteal hematoma to a complete tear of the acromioclavicular ligament with or without associated tear of the coracoclavicular ligaments. There will be varying degrees of pain, swelling and tenderness over the acromioclavicular joint with the pain increased if an attempt is made to separate the acromion and clavicle by pulling on the arm. In the severe injury there will be instability between the outer end of the clavicle and acromion. If the coracoclavicular ligament is involved a marked upward riding of the outer end of the clavicle in relation to the scapula is found. This can be demonstrated best with comparison x-rays of the shoulder in the standing position with and without a 5-10 pound weight suspended from the wrist.

We concur with O'Donoghue[13] that the simple contusion or sprain may be treated with local injection of procaine plus hyaluronidase, application of ice and a pressure dressing to prevent swelling. In the more severe incomplete ligament strain, the arm should be strapped to the side in such a way as to push the arm upward and the clavicle downward. O'Donoghue[13] feels that the complete tear of either or both the acromioclavicular ligament and coracoclavicular ligament in the young athlete should be treated with surgical intervention instead of prolonged support in a plaster jacket with straps over the clavicle or various other lever action devices. He uses two threaded pins through the acromion into the clavicle to prevent distraction of the two as well as to hold the clavicle down. He then opposes and sutures the torn ends of the coracoclavicular ligament and finally repairs the acromioclavicular ligament. Active motion with the arm held in a sling is permitted. The metallic internal fixation is removed in eight weeks. The player is then allowed to resume unlimited activity. A protective shoulder pad with suspension and attached cushioning effect brace placed against the ribs is preferred when he returns to active participation.

KNEE INJURIES

In the classical athletic injury of the knee, the foot is fixed to the ground or ice, the thigh rotates inward and the leg outward, the knee is forced inward toward the opposite leg and the stress is primarily received on the ligaments on the inner side of the knee. I was told frequently when first involved with hockey players that knee injuries were infrequent because the skates permit lateral sliding thus preventing fixation of the foot. However, I found this to be a false hypothesis. Three Olympic hockey players were sidelined with knee injuries during our first game with West Germany in the fall of 1967. These advisors forgot to consider the stabilizing effect of the ice versus a defenseman or the stabilizing force of two defensemen colliding. My experience, although far less than Janes[10] is similar in that I've never seen fibular collateral ligament or cruciate ligament tears in hockey. The medical collateral ligament and it's associated medial meniscus are the most frequently involved structures in knee injuries in hockey. The mechanism is the forceful adduction and/or internal rotation of the femur on the fixed tibia.

In a simple strain where the length and strength of the ligament is unimpaired and there is no evidence of "locking" or restricted extension or flexion motion, the problem is simply one of eliminating hemorrhage and edema, providing transitory rest to the joint to permit healing and most important protecting it against re-injury. This is done by protective strapping with adhesive tape before every practice and game. Strengthening the quadriceps muscles with corrective exercises completes the treatment. Packing injured knees in ice along with adhesive strapping kept many of our Olympic players functioning. I feel that stove pipe casts in the above minor strains unnecessarily retard progress for return to active participation.

Complete subluxation of the knee with a complete ligamentous tear, medial meniscus rupture or both, causing instability of the knee will not be helped with cast immobilization either. Here we follow the recommendation of Janes[10] and treat with primary surgical repair. The "wait and see" attitude has no place in treatment for it can only

mean acceptance of avoidable disability. Lou Nanne, star defenseman of the Minnesota North Stars and former Olympic player, had a complete tear of the medial collateral ligament diagnosed a long time after the original injury. His repair carried out by Janes[10], utilizing Fenton's[7] method of transplanting the semitendinosus tendon, was obviously successful. If only the meniscus is ruptured, our practice is to remove it immediately, keep the patient in bed five days with a massive compression dressing and bilateral plaster splints allowing crutches for two to three weeks post operatively. With early graduated quadriceps exercises there is little if any effusion, and the player is back participating in the strenuous game of hockey in approximately four to six weeks.

MOUTH GUARDS

Mouth guards should be required for hockey players at all levels of participation. **Pro-form,** a new concept in mouth guard tooth protection, has recently been developed by Dr. Robert May[11], a dentist and former hockey player and NCAA hockey championship coach. He has incorporated a palatal brace within an approved flexible vinyl. The front or labial material is shock absorbent and the rear brace transmits the penetrating blow the entire length of the tooth, thus preventing a small section of the tooth from receiving the major impact. **Pro-form** is a custom fit, of minimal size, adheres to the upper teeth allowing the athlete to drink water and talk properly without removal.

PROTECTIVE HELMETS

In the medical literature there are no statistics available regarding head injury and death attributable to hockey. However, as recent as 1968 Fekete[6] reported two cases of fatal head injuries in New Brunswick, Canada players, both protected by helmets. The third death of the 1967-68 season was Bill Masterton of the NHL Minnesota North Stars. These deaths focussed attention on the inadequacy of protective helmets when worn and whether or not helmets should be required for college and professional players as well.

The present helmet is a rather flimsey affair made of thin plastic material, usually ill fitting and protecting only the upper part of the skull. It may be compressed with one hand, has a ⅜ inch lining of plastic foam without suspension gear. Both New Brunswick players died from injuries to their temples. The present helmet does not protect the temples. In comparison, the football helmet has a rigid shell, suspension gear and protects the temples. In hockey we have the high topped tightly laced skates which protect against ankle injuries, the ankle strap which prevents lacerations of the achilles tendon and the face mask to protect goalies against lacerations, but nothing to protect the brain. Now it is time to demand the wearing of a light, well-fitted, rigid shell with suspension gear and adequate temporal protection. All these necessary requirements will avoid a shifting center of gravity, reduce the transmitted accelerating or decelerating velocity, and cushion the impact of blows or falls.

ADHESIVE STRAPPING

Many players with knee disabilities are attached to one or another type of support as indicated in my opening paragraphs. These have doubtful value. If the knee has been injured in the past and needs protection, for a weak ligament this can be best achieved by adhesive strapping. Cross strapping of the knee on either one or both sides prevents the condyle of the femur and the tibial plateau from separating and thus prevents further stress on the collateral ligaments. The cross hatch strapping also restricts rotation of the leg on the thigh so the familiar position of external rotation—abduction is prevented.

The high shoe on the skate does prevent ankle and foot injuries to a great degree but it does not replace a firmly tapped ankle as protection against re-injury of an ankle.

CRYOKINETICS

Cryokinetics or the application of cold for therapeutic reasons is not new to our era. The controversy over its relative value dates back to Hippocrates. Currently, with the help of strong advocates such as Grant[8], Bierman[2] and Haines[9], it is being used widely in physiotherapy particularily where acute musculoskeletal injuries are involved. We have been impressed that in athletes with acute injuries, ice provides a quick and effective way to relieve pain, reduce edema and effusion, depress spasm and spasticity and facilitate motor activity.

There is no absolute way at present to prove scientifically which modality is more effective; heat via hot packs, whirlpool, diathermy or cold via Ethyl Chloride sprays, ice massage or immersion or ice bags but an attempt will be made to review the experience and methods in the use of ice by others and indicate our concurrency with them.

One initial trial was conducted using Ethyl Chloride packs or spray. Travell[16] and Bierman[2] found this effective in the management of acute pain, especially that characterized by trig-

ger areas and referred pain. They believed that cold depresses the cutaneous pain receptors, terminating muscle spasm thus permitting passive stretching and active exercise. Ethyl Chloride has the disadvantage of being a highly inflammable anesthetic packed in glass containers. Self administration with safety is difficult. The British recommend and use a non-inflammable, non-anesthetic mixture of chloro-fluoromethanes under the trade name **Skefron.** This mixture can safely be given to the patient for use at home. Neither of these are as safe, handy, cheap or available as ice.

Grant[8] reported his experience with the use of cold in the management of 7000 patients having acute musculoskeletal pain. He utilized the ice massage or immersion technique and reported symptomatic improvement in 95% of those treated. Waylonis[17] and Bierman[2] found that ice significantly reduced skin temperature 66° F., subcutaneous tissue 55° F. and muscle mass at three cm. 34° F.

Haines[9] concluded that ice stimulated the fusimotor system and acted as a depressant on the nervous system with beneficial circulatory changes. She found a marked reduction in pain and edema which enabled full range of motion to be regained quickly.

The physiological effects of cold as related to acute injuries has been discussed in depth by Haines[9], Waylonis[17] and others and will not be reported here except to summarize their findings. Cold causes relative anesthesia of the skin with decreased sensory input. In addition, the fusimotor system and the nervous tissue in muscle are cooled, thus diminishing the stretch reflex. Decreased circulation in muscle increases the cooling effect and decreased sensory input becomes more pronounced, allowing for relaxation of spasm. This results in further decrease in resistance to stretch. This has been effective then in relief of pain and has allowed the performance of range of motion exercises with early mobilization.

We have applied the simple technique of "ice massage" as described by Grant[8]. A large piece of ice obtained by freezing water in an eight ounce can, removed from the can by placing it under a hot water faucet is preferred. This will cover a larger area, last longer and is easier to grasp or hold than an ice cube. A light circular or back and forth motion is used with the application carried out circumferentially from the painful site for five to seven minutes. A cycle of intense cooling, burning and aching ensues for about two to three minutes. This is followed by relative anesthesia or analgesia and relief of pain. For areas with bony prominences and irregular surfaces such as the elbow or acromioclavicular region, the part is immersed in ice for ten to twenty minutes or packed with ice cold towels surrounded with shaved ice particles. Following the use of cold, a systematic regimen of exercises directed toward full range of motion and early mobilization of the acutely injured part is instituted. The method can be taught initially in the office or training room with a follow-up regimen carried out by the athlete at home. There are no contraindications in the age group involving athletes.

The method is simple, requires no equipment other than ice, produces marked relief of symptoms and is a definite program for highly motivated athletes to obtain early mobilization and return to full participation.

BIBLIOGRAPHY

1. Baxter, R. H.: Prevention and Treatment of Sports Injuries, Medical Times, 700-706 (July) 1963.
2. Bierman, W.: Therapeutic Use of Cold, JAMA, 157: 1189-1192 (April 2) 1955.
3. Campbell, J. S., Fournier, Pierre, and Hill, D. P.: Puck Aneurysm, Canad. M.A.J., 81: 922-924, 1959.
4. Coventry, M. B.: Winter Sports Injuries, J. Lancet, 66-69 (February) 1965.
5. Editorial: Ice Hockey Can Be Safer, JAMA, Vol. 207, No. 9, 1706 (March 3) 1969.
6. Fekete, J. F.: Severe Brain Injury and Death Following Minor Hockey Accidents, Canad. Med. Assoc., J 99: 1234-1239 (December 28) 1968.
7. Fenton, R. L.: Surgical Repair of a Torn Collateral Ligament of the Knee by Means of the Semitendinosus Tendon (Bosworth Procedure): Report of Twenty Cases, J. Bone & Joint Surg., 39-A: 304-308, 1957.
8. Grant, A. E.: Masage With Ice (Cryokinetics) in the Treatment of Painful Conditions of the Musculoskeletal System, Arch. Phys. Med., 45: 233-238 (May) 1964.
9. Haines, J.: A Survey of Recent Developments in Cold Therapy, Physiotherapy, 53: 222-9 (July) 1967.
10. Janes, J. M.: Ice Hockey Injuries, Clin. Orthop., 23: 67-73, 1962.
11. May, Robert: Personal Communication.
12. Novich, M. M.: Management and Treatment Athletic Injuries, G.P., 30: No. 5, 78-85 (November) 1964.
13. O'Donoghue, D. H.: **Treatment of Injuries to Athletes,** W. B. Saunders, Philadelphia, 1962.
    O'Donoghue, D. H.: Surgical Treatment of Fresh Injuries to the Major Ligaments of the Knee, J. Bone & Joint Surg., 32-A: 721-737, 1950.
14. Raptou, A. D.: Cryotherapy: A Brief Review, South. Med. J., 61: 625-627 (June) 1968.
15. Thorndike, A. (1962): **Athletic Injuries,** 5th Edition, Lea & Febiger, Philadelphia: 233.
16. Travell, J.: Ethyl Chloride Spray for Painful Muscle Spasm, Arch. Phys. Med., 33: 291, 1952.
17. Waylonis, G. W.: The Physiological Effects of Ice Massage, Arch. Phys. Med., 48: 37-42 (January) 1967.
19. Wedlick, L., and Showman, J.: The Use of Cold Instead of Heat in the Relief of Muscle Spasm, Med. J. Aust. 2, 612, 1963.
20. Wedlick, L. T.: The Use of Heat and Cold in the Treatment of Sports Injuries, Med. J. Austro., 1050-1051 (December 2) 1967.

SIDE LINE OBSERVATION

by David G. Moyer, M. D.
Medical Director,
Germantown Academy, Team Physician,
Lafayette College

The absorption of the coach, trainer and team physician in play on the field is not the same as it is for the spectator. The Coach observes the success or failure of his offense or defense. The coach rates individual and cumulative performance, potential of the players fielded and whether or not they are fulfilling that potential. Indeed, he is usually aware of the performance potential of his opponents, and hopefully, their weaknesses.

The trainer sees the game in an entirely different context. His intimate maternal-paternal relationship with his team allows him an insight unique in the whole team organization. His appraisal is a pragmatic, practical assessment—once—again—of player potential based not only on desire, motivation and skill, but with respect to and with a thorough knowledge of the physical well being or lack of it.

The team physician, though cognizant of the stature of his players seldom has daily contact and has acquired his knowledge through the trainer, coach and player. His role in team efficiency is the use of more technical knowledge, experience and judgment as needed.

A top flight team health organization then, is a closely knit group of specialists whose prime interest is in the protection and management of the players whose interest they serve.

We on the sideline do not enjoy the vantage point of the spotter high up in the stands. Certainly the sideline is not the best place to watch a game, but the physician and trainer must be accessible and readily available. However the sideline has its advantage for one can see, hear, smell, feel and almost taste the progress of the battle. Beside coach and trainer, it has been my experience that the managers and members of the team on the side lines often spot situations not seen by trainer, coach or physician.

A position behind the team where one can see all eleven players before the play starts seems the best vantage point. Light or lack of it in night games, crowd noise, distance from play, snow, fog, dust and rain all may affect one's observations. Mud obliterates numbers, though it has been said that the safest field to play on is one with at least three inches of mud. Hopefully all physicians and trainers are aware of the traits, gaits, habits of posture, reaction to contact and the multiple physical and mental facets of the highly motivated, well trained modern athlete.

Empathy and rapport which carry coach, athlete, trainer and physician through practice and game to a satisfactory conclusion can only be the sum of close cooperation and understanding of all. The degree to which we keep athletes func-

tioning before, during and after a contest depends on an encyclopedic knowledge of the athlete himself and the arts and techniques peculiar to Sports Medicine. With all the extraneous factors mentioned indices of suspicion must remain high, senses constantly alert and tempered by a calm, circumspect "coolness".

Football today is an emotionally charged, incredibly complex game replete with its own terminology and is a highly organized big business. It is big business whether played at Germantown Academy or Georgia Tech, Rose Polytech or the Rose Bowl. Stimulating, colorful, diversely exciting, it involves thousands of hours of work and initiative and infinite amounts of patient planning.

Emotional involvement at any level is unavoidable. The emotional impact of newspapers, magazine, radio, T.V., Booster Clubs, Father's Clubs, Mother's Clubs, Alumni Clubs, make all of us susceptible to a total autumnal emotional binge.

From midget programs to the collegiate level football wags the whole athletic dog.

With tremendous active public interest in what is now most certainly the national game what then of the Warrior? Certainly all this brouhaha filters down to the athlete. How he responds to this highly charged situation affects the reactions and judgment of everyone involved in fielding the team.

These young men doing battle are zealots-militant and unbelievably dedicated—agile, mobile and hostile. These then are the subjects the team physician and trainer deal with. They are a challenge because their very dedication vitiates their response to conditioning, diagnosis, treatment and rehabilitation.

SPOTTING THE INJURY

The obvious, the dramatic injury is not nearly as great a concern to the trainer and physician patrolling the sideline since it usually presents an obvious diagnosis and obvious solution. However, certain injuries constitute a gray area. Injuries to certain joints, to the neck and head or a ruptured viscous represent grave cause for concern, since their presence may be masked, and signs and symptoms may be insidious in appearance.

The physician and trainer patrolling behind the team as it moves up and down the field are absorbed in the speed, skill and agility of impact, recovery from contact, precision in huddle and information, vocalization and/or lack of it.

Frequently the "hitter", the deeply committed combatant, the one who thoroughly enjoys body contact is the cause of greatest concern. His pain threshold may decrease in proportion to his desire to achieve and he does not know he is hurting. Proud and hostile he denies any injury. In many subtle ways he may dissimulate so that he can "stay in".

An inviolable rule on any well conducted squad is a lucid, precise reply to the question "Where are you hurt"? Often the answer is "I'm alright". If the situation were "alright" the physician and/or trainer would not be asking the question. There should be an understanding from the first day of practice that the player will attempt to communicate and describe his injury to the best of his ability. If he does not respond lucidly a giant step in diagnosis and judgment has already been taken.

Extremes of activity should make one wary. The player who bounces around and can't seem to get settled when the play is dead or at huddle time or who does not align well in huddle or formation is certainly suspect. Manic behaviour or over vocalization excites suspicion. Perhaps in the first five minutes of a game or in a tight situation "firing" may be relevant. If it continues, close scrutiny may reveal behaviour which is aimless and confused.

At the secondary school level and to a lesser degree in the older, experienced and more sophisticated athlete the tensions associated with the game sometimes produce an hysteria state. This may be manifested by crying, vocalization, fighting, and social judgment errors. Frequently hyperventilation occurs to a point of syncope. Breathing into a paper bag soon restores the CO_2 level and constitutes a welcome pause to bring things back to normal. Rarely trauma is the etiologic agent and can produce manic behaviour. A 230 lb linebacker speared an opposing back coming through the line in the 1969 Lafayette Vermont game and was knocked unconscious. After about two minutes in which he was totally unresponsive he "came to" regaining his defensive stance and knocked three anxious attendants sprawling, in the act. He was amnestic for about 40 minutes and quite vocal and somewhat irrational. Obviously a thorough knowledge of the personalities of one's personnel are very valuable in hysteria states.

On the other hand the slow returnee to the huddle with a broad based gait, belly out, shoulders back and head sagging may have "taken a shot". The heavy deep breather exhausted and spent must be watched for exhausted he is vulnerable and can not protect himself.

The chronic cough deserves great respect. The common cold of several days duration while not taxing the boy in everyday social intercourse, may in the explosive and constant demands of football bring him close to the limits of his pulmonary reserve and present an acute pulmonary emergency. The chronic cough or hiccoughs after a blow to the abdominal area may represent irritation to the diaphragm from hemorrhage from a ruptured viscous. The boy with the "wind knocked out" who responds slowly may have a collapsed lung produced from a spicule of a fractured rib or possibly the rupture of a pulmonary bullous. Dyspnea and cyanosis in a well conditioned athlete represents trouble.

Vomiting, incontinence of urine and/or faeces, of course, represents a catastrophic episode until proven otherwise.

Though it would appear that knowledge of water balance and prevention of heat prostration have finally gotten beyond the horse and buggy days the state of one's team in hot weather is still a great cause for concern. With longer seasons, preseason scrimmages under game conditions and perhaps a warmer climatic pattern, ceaseless vigilance is necessary. The interior lineman with his greater body mass and less proportionate evaporative surface for cooling should excite our interest more than the lean or slighter back. Mesh jerseys, proper fluid and salt intake eight to twelve hours prior to game time and adequate replacement and cooling during rest intervals, will help immeasurably in preventing trouble. The bulky, stocky individual merits extra attention on and off the field and should be thoroughly indoctrinated in keeping well hydrated.

The condition most requiring drastic, quick measures is a blocked airway. The most common cause is the swallowed tongue. Unconscious, cyanotic and sometimes convulsing the subject's jaw must be unlocked by oral screw and the tongue retrieved. Resuscitative measures, mouth to mouth resuscitation, cardiac massage or oxygen may be necessary to recover vital function.

Head injury and neck injury represent the greatest concern of all. The prone unconscious player who on being rolled to a supine position and still has crossed legs is usually more deeply unconscious. The helmet stays on until the injury can be assessed. The helmet possesses a splinting effect. Its precipitous, careless rough removal may play havoc with a cervical spinal cord injury. If injury to the head and/or neck is suspected, quoting Dr. Joseph Torg, one should move the athlete "like a log". This means that his body from toes to top of the helmet should be moved in a straight undeviating line with gentle traction to the helmet. This takes many pairs of hands, infinite patience, calm and lots of time. Transfer to a stretcher and smooth transit are mandatory. No athletic contest or practice should ever take place without a stretcher available and ready.

The long necked boy or the boy with a neck collar deserves special attention and consideration. The collar represents a protective device against neck injury, or even more important, a protective device against recurrence of a previous neck injury. Long necks mandate use of collars regardless of neck development and contrary to the athletes objection that collars impair their performance and peripheral vision.

If a boy grasps and/or shakes his arm and/or fingers this does not necessarily signify an injury to the extremity. It may represent an injury higher up in the brachial plexus or its origins, with loss of sensation, motor power, numbness and tingling. The greater the extent of any or all of these and the longer the duration the greater the involvement of the plexus, its roots or the column itself.

As the season wears on accidents lessen. Many factors obtain. Survival of the fittest certainly plays a real role here. Coordination and techniques develop, the athlete develops a sense of timing, cadence and pace that make the game undergo more perfect execution. The weather improves and teams are more evenly matched. All of this works to the advantage of the coach, trainer and physician who are now watching more seasoned troops who they know far better than they did eight weeks before. By November the accident prone, the dissimulator, the "hot dog"—the multifaceted traits of one's personnel are old friends—and enemies, and the sideline vigil that begins with the kickoff can be approached with far more equanimity than in early September.

As mentioned above, unquestionably the worst area in the world to make a diagnosis is on the field or sideline. In the face of the slightest doubt, decisive, careful, quick removal to locker room, or field house, infirmary or hospital is wise. I have never developed any reasonable degree of skill in determining pupillary reflexes, eliciting a history, palpating any area of the body ensheathed in padded uniform or making a positive diagnosis in the coliseum. Emergency measures must always be taken but a calm, reasoned assessment of the present and future status of most injuries demands the peace and quiet of the dressing room or comparable facility.

Bits and Pieces

by Clyde Stretch

THE JOURNAL TEN YEARS AGO—
FALL, 1960

Basic Areas of Prevention of Athletic Injuries," by Robert G. Brashear, M.D. Dr. Brashear numbers the basic areas of athletic injury prevention at three. The first, and "probably most important" area is the coach, since he directly controls the majority of the football environment. The second area is that of the team physician. Emphasis is made of the fact that while physicians are involved with youth from their birth until death, there is nevertheless a definite lack of medical involvement on the high school level during the period of dangerous athletic participation. The third area is that of the athletic trainer, in which Dr. Brashear discusses the need for an athletic trainer and the steps that the NATA has been taking in professionalizing the athletic trainer.

"Low Back Strain," by Marvin Roberson, R.P.T. The author describes the low back strain as an injury generally brought about by a trauma of the iliolumbar and/or the sacroiliac ligament structures. He mentions that this strain is most commonly caused when the athlete: sleeps in a soft bed; sits in poor posture positions; changes his form of physical activity; fails to warm up sufficiently or properly; wears improperly fitting shoes; receives a direct blow or traumatic injury in the area with accompanying spasm; improperly picks up a heavy object; or walks with more of his body weight on one leg to compensate for a foot or ankle injury.

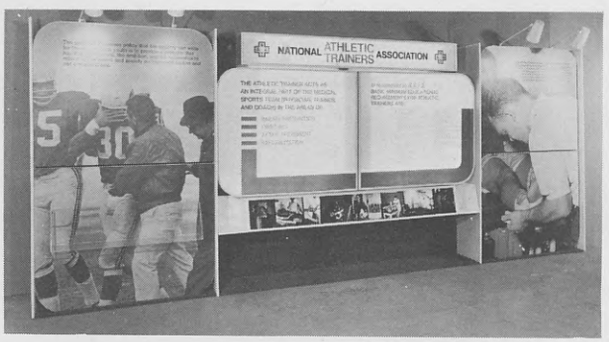
Effective treatment for the condition was described as: Altering or ending the cause of the injury, if possible; discontinue activity to enhance healing; apply deep heat; massage to reduce spasm; begin exercise with passive and then active stretching; provide corrective posture instructions; and, if needed, provide some support.

It is pointed out that all of this should be done in conjunction with a physician.

"Injuries to the Foot and Ankle," by Judson D. Wilson, M.D. Dr. Wilson's six page article discusses the importance of conditioning and ankle wrapping the anatomy and the simple mechanics of the ankle joint, ankle sprains and their management, injuries to the muscles and tendons of the lower leg, and a brief discussion of foot injuries. Some of the highlights include:

"It all boils down to the axiom that a team is no better than its physical condition."

"Dr. D. F. Hanley, of Bowdoin College, made the statement that "We have not lost a man for a game in five years, who has worn his ankle wraps correctly."



COVER PHOTO

Denver, Colorado was this year's site for the 21st Annual Convention of the National Athletic Trainers Association. A record attendance coupled with outstanding speakers made this convention one of the finest.

"In a separation of the tibio-fibular syndesmosis, there is a tear of the interosseus ligament and membrane which allows a spreading of the ankle mortise and usually a lateral displacement of the astragalas and produces an unstable joint. The force that ruptures the interosseus membrane and ligament is due to a sudden eversion or abduction."

"A condition frequently seen in athletes is a recurrent dislocation of the peroneal tendon."

"A certain number of athletes, particularly track athletes, will develop pain in the forefoot beneath the metatarsal heads, or so-called Morton's toes or flattening of the transverse arch at the level of the ball of the foot, and is designated as metetarsalgia."

In a comment which sums up his discussion, as well as this review, Dr. Wilson says, "May I say that it is impossible in a short period of time to adequately discuss injuries and treatment of the foot and ankle."

"Varsity Football Injuries," by Stephen E. Reid, M.D. and Verner Swan, M.D. The authors present a two year study of football injuries at Northwestern University. The results led to some of the following statements:

1. The number of injuries, when considering the nature of the sport and the number of participants, is relatively small.
2. The bulk of injuries occur prior to the players reaching their peak condition.
3. The "platoon system" reduces the number of tired players and consequently the number of injuries associated with that condition.
4. Equipment improvements have reduced injuries.
5. Improved rules have helped prevent injuries.
6. With the advent of ankle taping, the knee has become the most common area injured, replacing the ankle.
7. Once a knee is injured, it is likely that a recurrence will follow at some time.
8. Proper conditioning of the leg of the injured knee can reduce the possibilities of a recurrence.
9. De-emphasis of football, especially in terms of abolishing spring football, would not necessarily make the game more safe.

• • •

Al Hart, chairman of the Placement Committee, has requested that it be announced the committee is now functioning at a level where it is able to provide placement services. Although the forms have yet to be finalized, placement services are now available to those who want them. The committee expects to have its work well in order by late Fall, and will provide full service during the coming year.

Intentions of the committee at this time are to provide the placement service on a subscription basis, which does not imply that money is involved, but merely that the committee must be contacted directly with a request for its services. Communications with the committee should be directed to:

Alan Hart, Head Trainer
Department of Athletics
Ohio University
Athens, Ohio 45701

• • •

Inquiries have been made about obtaining the articles listed in the "Recent Athletic Training Literature" section. Here is an offering of some possible methods.

An effective, although expensive method, would be through subscription. Many of the articles appear in a select group of publications. Determining which publications provide the majority of articles and subsequent subscription to them, either personally or through an institution, should supply many articles.

Universities with medical schools, of course, have medical libraries which should be able to supply any publication listed. Many other university libraries are part of an inter-library loan system which could supply the necessary references on request.

When university libraries are not available, a hospital library should be able to supply the more commonly used medical publications. Many physicians also carry several journals in their personal libraries, and may be used as a reference source.

Most publications offer single copies of each issue. Contacting the group that published the desired material can be an effective method used to obtain that material. This method can become expensive, however, as prices for single issues cost about $1.00 or more each.

A final alternative is that of reprints. Most publications supply article reprints to the authors. The authors, in turn, will supply these reprints to those who make a written request. As with each of these suggestions, this too has its drawbacks. To obtain article reprints, the author must be written to directly. The publisher will not supply reprints.

While some of these methods may not be entirely suitable, hopefully they will provide some useful alternatives in obtaining the desired material.

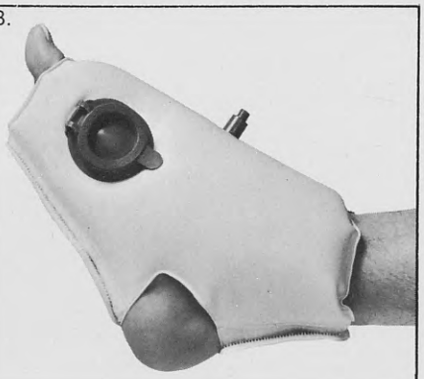
1st Aids.
Bike® Trainer's Supplies.

For trainer's supplies that help more... help faster... Bike® is the 1.

Your team deserves the best . . . and Bike is the 1. Bike has a bigger, better-than-ever line of trainer's supplies . . . designed with you, your men, your equipment in mind. Tested and proven—on the field and in the training room.

A.

B.



C.

D.

E.

F.

(A) 6560 Half-Time Punch. The first and only thirst quencher made from the juices of real lemons and limes. Sugar-sweetened—never any saccharin or cyclamates. A quick, delicious thirst-slaker with no unpleasant after-taste or after-thirst . . . for rapid replacement of important body fluids, salts and sugars lost through sweating.

(B) Cold Press Splints. Inflatable splints that provide cold and compression for injuries—simultaneously. Each with an inner compartment for ice or cold chemical (Cold Press Fill Paks).

3682 Ankle
3931 Arm
3709 Knee
3812 Thigh
7056 Cold Press Fill Paks (Carton of 6)

(C) Formula 87 Skin Toughener. A pre-taping skin coat that helps prevent blisters and skin irritations. Special germicidal formula with hexachlorophene. Aerosol and liquid.

6935 12-oz. aerosol
7075 16-oz. aerosol
7104 1-qt. liquid
7191 1-gal. liquid

(D) Thermo Pack Analgesic. Faster, longer heat relief for aches, pains, sore muscles. Great for pre-game warmup and for overnight therapy. Regular or extra-convenient aerosol.

6417 13-oz. aerosol
1285 1-lb. can reg.
1419 5-lb. can reg.
1544 25-lb. can reg.

(E) 3323 Cold Pack. Gives you 25-degree cold in only 3 seconds. Just squeeze pack and apply to reduce swelling and relieve pain—fast!

(F) Bike Adhesive Bandages. 3" plastic strips with exclusive "Ouchless" Telfa pads. Ventilated to speed healing. New, improved adhesive. 200/carton.

1930 ¾" width
7146 1" width

See our Catalogue or Price List for prices and the complete line of Bike Athletic Products.

KENDALL
BIKE ATHLETIC PRODUCTS DIVISION

309 West Jackson Blvd., Chicago, Illinois 60606

WHEN YOU ORDER TRAINER'S SUPPLIES, USE THE 1ST NAME: BIKE

(From the April, 1970 issue of **Pennsylvania Medicine**)

ATHLETIC INJURY RELEASE OF INFORMATION GUIDELINES

The Judicial Council of the American Medical Association offers good advice to physicians who are involved in the treatment of injuries to athletes and who are confronted by representatives of the news media seeking information regarding the injuries.

According to an official opinion of the council, "A patient or a responsible friend or relative may authorize a doctor to disclose certain health information to the press. Under these conditions, the release of information by the physician does not violate any ethical principle. However, a doctor may release only authorized information or that which is public knowledge."

The statement is cited as a good legal as well as ethical guide. Legally, a physician may release only that information which is public knowledge or information authorized by the patient.

• • •

The American Medical Association, through its health education materials, provides several items of interest to the athletic trainer. These items include:

1. **Standard Nomenclature of Athletic Injuries** lists over 500 injuries and conditions affecting athletes. Each listing includes the perferred term, alternate terms, etiology, symptoms, complications, X-ray and lab data, and pathology. The cross-reference index has 1,100 entries. 158 pp. $1.50

2. **Tips on Athletic Training** I-X: A series of 10 booklets prepared in cooperation with the National Federation of State Athletic Associations. Among the timely, interesting articles featured are: "Amphetamines and Athletes," "Injuries and Emotions," "Hot Weather Training Hints," "The Knee in Sports," "Wrestling and Weight Control," and "Spearing in Football," 15¢, 25¢

3. First Aid Chart for Athletic Injuries, 10¢.

4. A Guide for Medical Evaluation of Candidates for School Sports (For physicians, trainers and athletic administrators), 25¢.

5. Safeguarding the Health of the Athlete, 10¢.

Catalog and order forms may be obtained by writing:

Order Department
American Medical Association
535 N. Dearborn Street
Chicago, Illinois 60610

A note to those of you who like to get your reservations in early, the upcoming sites for the national meetings are: 1971, Baltimore; 1972, St. Louis; 1973, Atlanta; 1974, Kansas City (25th anniversary); 1975, Anaheim; and 1976, Boston.

• • •

Depending on your point of view, either due to or thanks to NATA reorganization, this will be the last "Bits and Pieces" in its present form. Speaking personally, I am very optimistic about the future of the Journal and the job that the new Journal committee will do. I have enjoyed putting this column together over the past few years, finding it interesting, informative and stimulating. I hope it was the same for you.—C.J.S.

• • •

CALENDAR

1. September 12-13; The Third Annual Athletic Injuries Seminar presented by the New York Osteopathic Society at the Thruway Hyatt House, Albany, New York. Information: The New York State Osteopathic Society, 87 South Lake Avenue, Albany, New York, 12203.
2. September 18-20; A scientific program, "Sports Medicine," as a part of the Annual Meeting of the Kansas Chapter of the American Academy of General Practice at the Holiday Inn, Lawrence Kansas. Information: Gene M. Wilcox, Executive Secretary, Kansas Chapter, American Academy of General Practice, 521 State Bank, Winfield, Kansas 67156.
3. October 23-27; the American College Health Association convention, Sheraton Lincoln Hotel, Houston, Texas. Information: Dr. Glenn R. Knotts, American School Health Association, P.O. Box 416, Kent, Ohio 44240.
4. November 29; Twelfth National Conference on the Medical Aspects of Sports, Boston, Massachusetts. Information: William Burnette, American Medical Association, 535 N. Dearborn Street, Chicago, Illinois 60610.
5. December 5; The Fourth Annual Medical Aspects of Sports Seminar, Catonsville Community College, Baltimore, Maryland. Information: Ramsay B. Thomas, M.D., Chairman, Medical Aspects of Sports Subcommittee, Medical and Chirurgical Faculty of State of Maryland, 1211 Cathedral Street, Baltimore, Maryland 21201.

Convention Notes - 1970

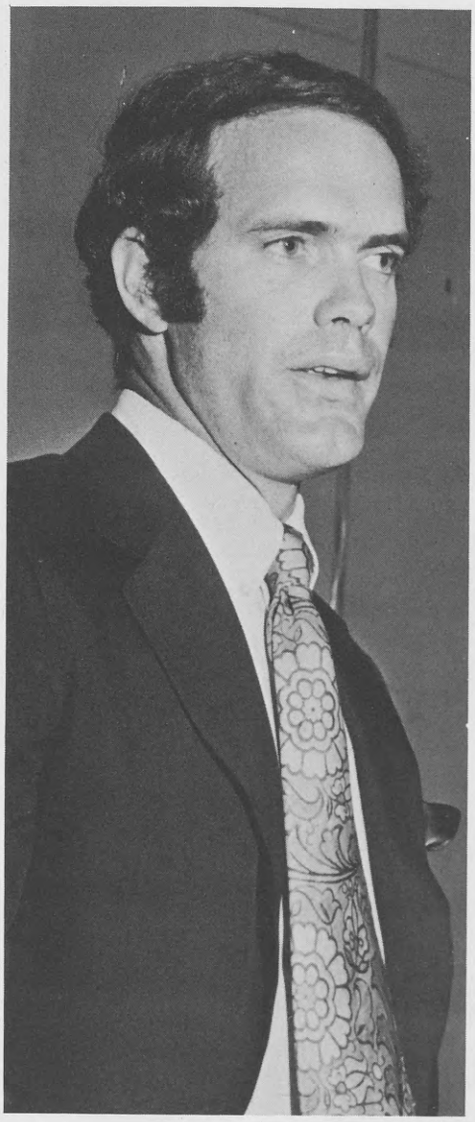
The mile-high city of Denver welcomed over five hundred athletic trainers and their families for the Twenty-First Annual Meeting of the National Athletic Trainers Association. Accompanying the fine scenery, was the convention program shaped by Jim Conboy, the entertainment organized by Allen Hurst and the abundance of exhibitors enrolled by Warren Ariail, which made the meetings in Denver well worth the trip.

Highlighting the meetings was the Honorary Membership and Awards Banquet held Monday evening, June 8. At the banquet, which featured entertaining guest speaker, world decathlon champion Bill Toomey presentations were made to the William Newell Scholarship Award winner, the new honorary member and this year's Helms Hall of Fame recipients.

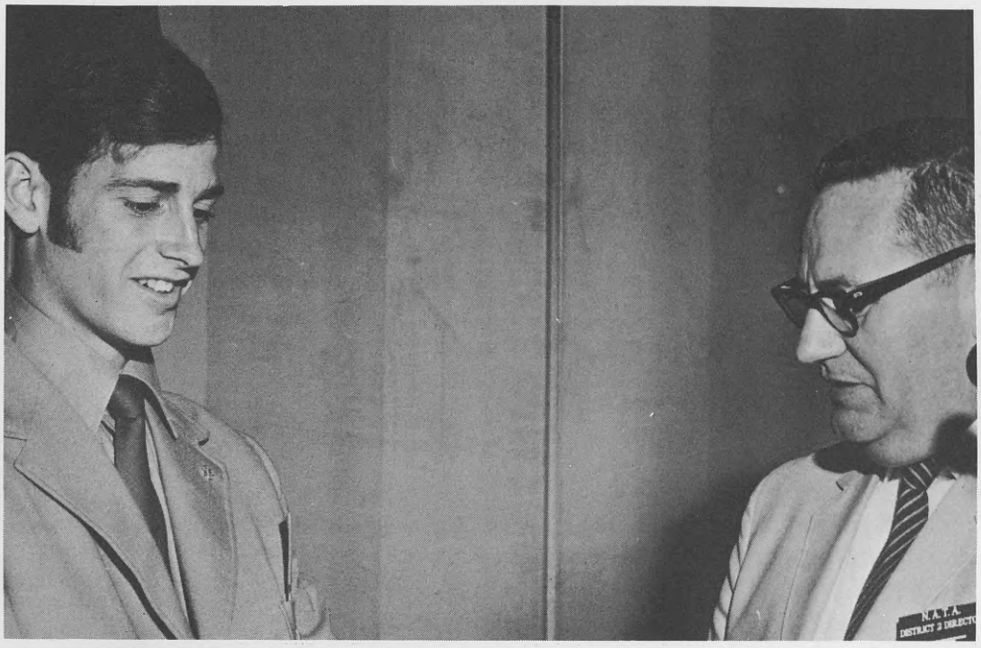
Receiving the William Newell Scholarship Award was Al Shelley, a sophomore at the University of Washington.

Initiates into the Helms Hall of Fame, welcomed by George Sullivan, included Joseph N. Abraham, Hobart College; Delmer Brown, East Texas State; Elmer Brown Texas Christian University; Richard K. Cole, University of Rhode Island; Dwayne "Spike" Dixon, Indiana University; and Sam Lankford, Virginia Polytechnic Institute.

NATA Honorary Memberships were awarded by Don Fauls to Herman J. Bearzy, M.D., Dayton, Ohio; G. Edward Crane, M.D., Brown University; James S. Feurig, M.D., Michigan State University; Roland "Kickapoo" Logan, Logan, Incorporated; and John J. McGillicuddy, M.D., Boston Red Sox for their outstanding assistance to the athletic training profession.



Bill Toomey, Banquet Speaker



William E. Newell—Scholarship Fund Award

John J. McGillicuddy, M.D.

Roland "Kickapoo" Logan, with Don Fauls

Edward Crane M.D.

Dr. James Feurig

Helms Hall Inductees.

National Notes

by Jack Rockwell, Executive Director

Here we go again, another football season starting and everybody goes back to work. Seems like only yesterday that so many of us were together in Denver. What a great convention that turned out to be. The largest attendance ever, a great clinical program, and without doubt the finest family turnout we've ever experienced. Denver was a great city for the Convention and the District 7 people did a superb job of putting everything together. On top of the great time that everyone had, a great amount of work was accomplished. The Board of Directors, by conducting some non-stop meetings, was able to implement the Reorganization Plan and to further develop the Professional Advancement work that was started in 1965. The Board of Certification was voted into existence by the Board of Directors and was authorized to give the first Certification Examination during the District 6 meeting in Waco, Texas in August. Fifteen applicants were scheduled to take the examination as this copy of the Journal went to press.

With the completion of this year's Board meetings and the clinical program at Denver it has become even more apparent that we must all take stock of the future of our Association and our profession. We have made tremendous strides but definitely, have much to accomplish if we are to continue to evolve as an integral part of the Sports Medicine team at all levels of athletic competition. In these rather unsettled days we constantly are made aware of the barbs and criticisms hurled at the athletic field as a whole. All of us must be included in these critical attitudes, whether we feel that we deserve them or not, but we must also be able to defend our position, our attitudes and our philosophy. In a recent issue of Medicine in Sports, Dr. Fred Allman made the following statement concerning the field of Sports Medicine: "The ultimate aim of all individuals interested in sports medicine is to prevent injuries whenever possible, to make a prompt, precise diagnosis when injury occurs, to treat correctly, and to totally rehabilitate each athlete." Excluding the diagnosis, which is of course the physician's job, the athletic trainer is involved in every other area of the Sports Medicine picture. If we remember this and practice the total concept, we can continue to grow intellectually and to develop and strengthen the respect of both the athletes we work with and the public, which is only now becoming aware of the athletic trainer's place in society. The harder each of us works in his own community to develop better understanding of what exactly an athletic trainer does, why he exists, and what his responsibilities are, the sooner we can hope to gain not only professional stature but also public support.

With the advent of Certification, our Approved Curriculum in six major schools, and more precise standards within our Association and our profession, it is evident that we must all work at developing interest in our profession among young people. All of us must work at recruiting good, intelligent, dedicated people who will be a credit to the athletic training field. Motivating young people to enter school in pursuit of Athletic Training Certification is a job all of us can work at during all of our working hours. Our progress has been great, but we must continue to recruit or we will go backwards instead of forward.

It was great to see the turnout at Denver; it should be gratifying to all of us as members. Best wishes to all of you in the coming months.

Recent Athletic Training Literature

This list is generally restricted to those areas of specific interest to the athletic trainer. Topics belonging to the broad areas of athletics, physical education and physical therapy will usually be omitted.

Abraham, J. N.: "Trainer's Role in High School Athletics," *New York Journal of Medicine* 70: 537-42; 15 February, 1970.

American Academy of Pediatrics. Committee on Children with Handicaps: "The Asthmatic Child and His Participation in Sports and Physical Education," *Pediatrics* 45:150-1; January, 1970.

Christophe, K., et al: "A Follow Up Study of Athletic Injuries," *Journal of the American College Health Association* 18:210-2; February, 1970.

Clarke, K. S.: "Sports Medicine in Perspective," *West Virginia Medical Journal* 66:44-7; February, 1970.

Conwell, H. E.: "Injuries to the Wrist," *Clinical Symposia* 22:3-30; 1970.

Conway, D. H.: "A Modified Athletic Shoe wtih Adjustable Midfoot Sling," *Journal of the American Podiatric Association* 60: 118-21; March, 1970.

Cooper, R. R.: "Tendon and Ligament Insertion. A Light and Electron Microscopic Study," *Journal of Bone and Joint Surgery* 52A:1-20; January, 1970 (57 ref.).

Dellastatious, J. W. and W. Cooper: "Physiological Aspects of Competitive Sports for Young Athletes," *Physical Educator* 27:3-5; March, 1970.

Devas, M. B.: "Stress Fractures in Athletes," *Journal of the Royal Academy of General Practice* 19: 34-8; January, 1970.

Eichler, A. C., et al: "Heat Stroke," *American Journal of Surgery* 118:855-63; December, 1969 (58 ref.).

Fowler, W. M., Jr.: "Facts About Ergogenic Aids and Sports Performance," *Journal of Health, Physical Education and Recreation* 40:37-42; March, 1970.

Gey, G. O., et al: "Effect of Ascorbic Acid on Endurance Performance and Athletic Injury," *Journal of the American Medical Association* 211:449-52; 19 January, 1970.

Harty, M.: "Anatomic Features of the Lateral Aspect of the Knee Joint," *Surgery, Gynecology and Obstetrics* 130:11-4; January, 1970.

King, J.: "Analysis of the Pitching Arm of the Professional Baseball Pitcher," *Clinical Orthopedics* 67:116-23; November-December, 1969.

Lindahl, O., et al: "Knee Extension. Measurement of the Isometric Force in Different Positions of the Knee Joint," *Acta Orthopedica Scandinavica* 40:79-85; 1969.

Londeree, B. R., et al: "Water Replacement Schedules in Heat Stress," *Research Quarterly* 40: 725-32; December, 1969.

Percy, E. C., et al: "The "sprained" Ankle," *Journal of Trauma* 9: 972-86; December, 1969.

Percy, E. C.: "The Physician and the Athlete," *Canadian Medical Association Journal* 102:137-9; 31 January, 1970.

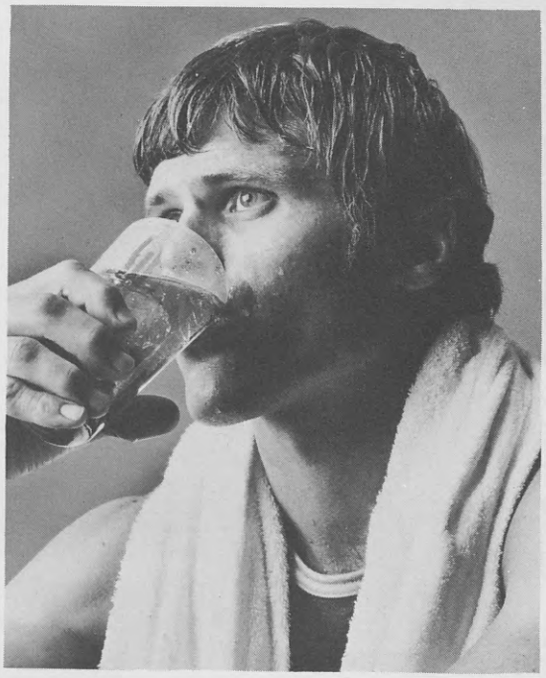
Peterson, T. R.: "The Cross-Body Block, the Major Cause of Knee Injuries," *Journal of the American Medical Association* 211: 449-52; 19 January, 1970.

Reed, D. J., et al: "A Joint Angle Detector," *Journal of Applied Physiology* 27:745-8; November, 1969.

Southard, S. C.: "Pre-Adolescent Athletics, The Role of the Parents, the Family Physician and the Team Sponsor," *Journal of the Medical Society of New Jersey* 67:53-8; February, 1970.

Suker, J. R.: "The Medical Aspects of Professional Baseball," *Illinois Medical Journal* 137:89-92; January, 1970.

We don't think a player dying of thirst should have to suck on an orange.



He should be able to have a drink.

But who ever heard of drinking during a game?

A fantasy, right?

Wrong.

Because now there's Sportade.[action drink]

The special Sportade[action drink] combination of carefully selected ingredients will enable your team to drink it while they're playing.

Without becoming waterlogged.

And along with quenching their thirst, Sportade[action drink] provides metered energy so that as the game wears on, it'll help to keep your players from wearing out. That's because Sportade[action drink] is made with the elements the body uses during activity.

Sportade[action drink] is a dry mix, which when added to water makes a gallon, and is made with natural sweeteners and comes in a variety of natural flavors.

At the next game your team plays have some Sportade[action drink] on the bench.

Because sucking on oranges isn't the best way to quench a player's thirst any more.

BECTON B-D DICKINSON
Consumer Products Division
Becton, Dickinson and Company
Rutherford, New Jersey 07070

Sportade.® You can drink it while you're playing.

Guide for Contributors

The editors of the *Journal of the National Athletic Trainers Association* welcome the submission of articles which may be of interest to persons engaged in or concerned with the progress of the athletic training profession. Submitted articles are considered as a contribution to the profession; no remuneration can be made. The following recommendations are offered to those submitting articles:

1. All manuscripts should be typewritten on one side of 8½ x 11 inch typing paper, double-spaced throughout.

2. Photographs should be black and white prints, preferably on glossy paper. Graphs, charts or figures should be clearly drawn on white paper, in a form which will be readable when reduced for publication.

3. When references are made to other published works, the list of references should be in the following order: a) books: author, title, publisher with city and state of publication, year, page; b) articles; family names and initials of all authors, title of article, either the full journal title or the title as abbreviated in the latest edition of *List of Journals Indexed in Index Medicus,* volume, inclusive pages, date.

4. It is the understanding of *The Journal* editors that manuscripts submitted will not have been published previously; and that the author accepts responsibility for any major corrections or alterations of the manuscript.

5. It is requested that each submitting author include with the manuscript a brief biographical sketch of himself.

Unused manuscripts will be returned when accompanied by a stamped, self-addressed envelope.

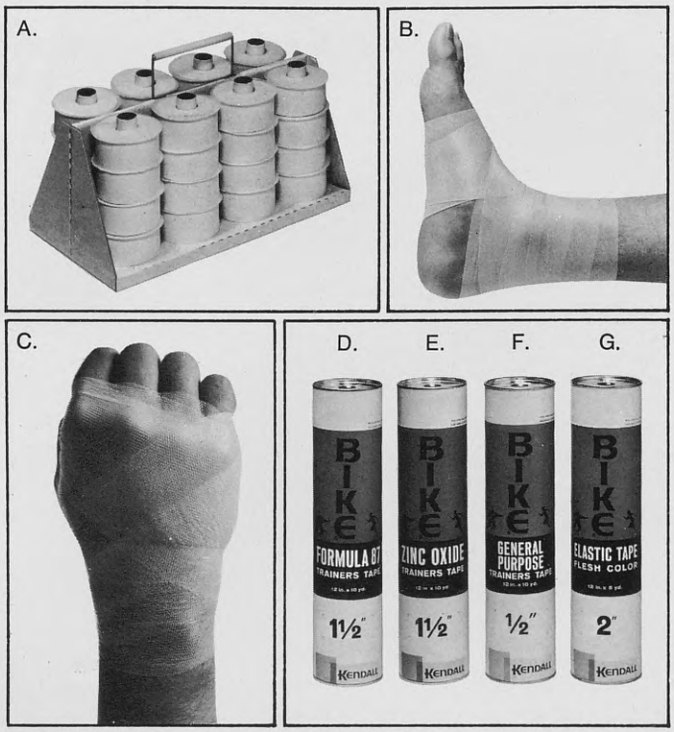
Address all manuscripts to:

Marvin Roberson, Editor
165 Smith Field House
Brigham Young University
Provo, Utah 84601


The first in safety-first.
Bike® tapes.

For new, exclusive trainer-researched tape products Bike® is the 1.

The one that works with college and pro trainers to develop new and unique tapes and taping accessories specifically designed to fit your needs. So ask for Bike. You'll get what you want.



New Bike Conform Tear Tape. The *only* tape of its kind. Developed in cooperation with college and pro trainers. Dual purpose. Stretches like elastic tape, conforms like skin, tears easily, handles smoothly. For maximum support and protection without constriction, Bike Conform is the 1.

(A) New Bike Conform Tear Tape in portable School Pack.
2715 1½" x 7½-yd. **6422** 3" x 7½-yd.
3263 2" x 7½-yd.

(A) Regular Bike Trainer's Tape Formula 87 School Pack Tape
6115 1½" x 15-yd. **3558** 2" x 15-yd.

Zinc Oxide School Pack Tape
7121 Regular 1½" x 15-yd.
2965 Porous 1½" x 15-yd.
7341 Regular 2" x 15-yd.

General Purpose School Pack Tape
1895 Regular 1½" x 15-yd.
2787 Porous 1½" x 15-yd.
3563 Regular 2" x 15-yd.

Bike Trainer's Tape. In individual rolls. Easy unwind, fast application, superior protection.

(B) 7371 Bike Pro-Wrap Pre-Taping Underwrap. New concept! Deluxe underwrap cushions like foam rubber, conforms like skin, stretches like elastic. Hypo-allergenic, moisture-proof, won't cause blisters. No need for jelly or pads. Tears easily, handles smoothly. 3" x 30-yd. rolls on crushproof plastic cores. 50 rolls/case.

(C) 1992 Bike 8-Wrap Pre-Taping Underwrap. Revolutionary! The original "snakeskin" underwrap, conforms like skin. Hypo-allergenic, moisture-proof, will not cause blisters. Tears easily, handles smoothly. Yet costs less than others. 3" x 100-yd. rolls on crushproof plastic cores. 40 rolls/case.

(D) Formula 87 Tape. The superior conventional tape for protective strapping. Durable cloth backing, high tensile strength. Exclusive crushproof plastic core. 12" x 10-yd.
1515 1" Cuts. **1598** 1½" Cuts. **2028** 2" Cuts.

(E) Zinc Oxide Tape. Our most popular grade. Greater economy and flexibility. Same high-quality adhesive as deluxe Formula 87. Exclusive crushproof plastic core. 12" x 10-yd. roll.
2109 ½" Regular **2286** 2" Regular
2174 1" Regular **2267** 3" Regular
2182 1½" Regular **7264** 1½" Porous
3036 R-14 Assortment
(Two each 1" and 2", four 1½").

(F) General Purpose Tape. Most economical, lightweight. Same high-grade adhesive as deluxe Formula 87. Exclusive crushproof plastic core. 12" x 10-yd. roll.
1018 ½" Regular **2506** 2" Regular
1704 1" Regular **7532** 1½" Porous
2426 1½" Regular

(G) Elastic Tape. Maximum strength and stretch to support any flexible joint. Flesh-colored. 12" x 5-yd. roll.
2975 2" Cuts. **1436** 3" Cuts. **3704** 4" Cuts.

See our Catalogue or Price List for the complete line of Bike Athletic Products.

KENDALL
BIKE ATHLETIC PRODUCTS DIVISION
309 West Jackson Blvd., Chicago, Illinois 60606

WHEN YOU ORDER TAPES, USE THE 1ST NAME: BIKE

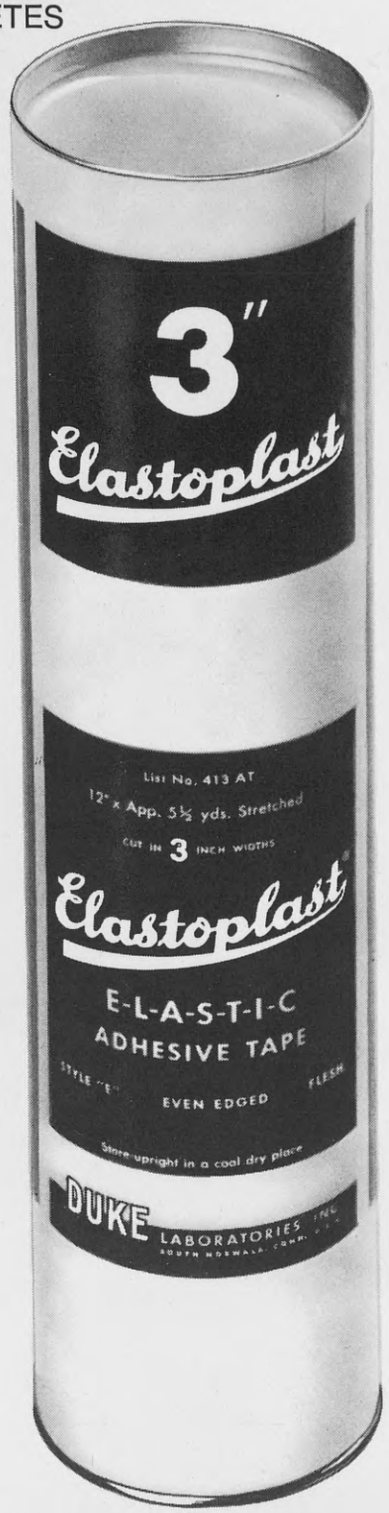
for PROTECTION · SUPPORT · COMPRESSION

THE TRAINERS' FIRST CHOICE FOR PRE-GAME AND PRE-PRACTICE STRAPPING
TO HELP AVOID INJURIES TO ATHLETES

Elastoplast® "AT"

ATHLETIC TAPE

THE DEPENDABLE ORIGINAL E-L-A-S-T-I-C ADHESIVE



ELASTOPLAST "AT" Athletic Elastic Adhesive Tape adheres firmly...

Has Superior Stretch—from 3 yards slack to approx. 5½ yards—and unexcelled Contraction . . .

Assures players freedom of action.

ELASTOPLAST TAPE TUBE PACKING

12" x 5½ yards (stretched)

Order Numbers:		
410-AT	12 rolls	1" cut
411-AT	8 rolls	1½" cut
412-AT	6 rolls	2" cut
413-AT	4 rolls	3" cut
414-AT	3 rolls	4" cut

Case lots of 12 tubes of same cut available at institutional discount.

DUKE LABORATORIES, INC.
SOUTH NORWALK, CONN., U. S. A.

ELASTOPLAST–MADE IN U.S.A.–THE ORIGINAL E-L-A-S-T-I-C ADHESIVE TAPE AND UNIT DRESSINGS

Microbicidal power

Microbicidal power of a BETADINE antiseptic was used in Apollo 11/12 Splashdowns

For effective decontamination of water in whirlpool baths

The same broad-spectrum microbicidal power which was used in decontamination procedures after Apollo 11/12 Splashdowns is available in BETADINE Whirlpool Concentrate.

BETADINE Whirlpool Concentrate promptly reduces bacterial contamination of water in whirlpool baths and tanks before and during physical therapy procedures...kills microorganisms in the bath, including *Pseudomonas* strains, *E. coli* and staphylococci.

Virtually nonstinging, nonirritating and nonstaining to skin, mucous membranes, and to natural fabrics, BETADINE Whirlpool Concentrate substantially provides the efficacy of iodine without its drawbacks. It is also economical to use. As a rule, one fluid ounce of BETADINE Whirlpool Concentrate disinfects about 20 gallons of water.

Supplied: One (1) gallon. Also available: Dilution chart giving specific amounts for various tank sizes.

Purdue Frederick
The Purdue Frederick Company, Yonkers, New York 10701