PURCHASE AND CARE OF PHYSICAL EDUCATION EQUIPMENT IN THE HIGH SCHOOLS OF OREGON

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A PAPER

submitted to

OREGON STATE COLLEGE

in partial fulfillment of
the requirements for the
degree of

MASTER OF EDUCATION

June 1952

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Date Paper is presented July 26, 1951

Typed by Evelyn McEntee

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CHAPTER I

INTRODUCTION

Need for the Study. Among men who know athletic equipment best--the sporting good salesmen, representatives of reconditioning firms and authorities in the field of physical education--there is a nearly unanimous opinion that our schools are doing a poor job of caring for their equipment.

Neglect and disorganization on the part of coaches, athletic directors and other school personnel seem to be the greatest contributing factors in the poor care of equipment. No one seems willing or has adequate background to shoulder the responsibility. A shoe, for example, will not oil itself. A lot of time and messy labor is involved. So the coach, with his many other duties and responsibilities will pass it on to an untrained and unconcerned student manager, who knows little or nothing about when to oil the shoe, what oil to use, and how to apply it.

Additional reasons for the neglect of athletic equipment are:

1. The coach is preoccupied. This is justified in

many cases. After teaching several classes a day and conducting a two-hour practice session, he feels like heading for home and not the equipment room.

2. The coach in some instances is not interested. It takes a great deal of extra effort and time to do justice to the care of equipment. He often forgets that boys thrive on organization, clean equipment, and some personal consideration.

3. Many schools in Oregon are handicapped by poor facilities in caring for their equipment. Inadequate drying rooms for use during the season, poor storage space for equipment between seasons and in many cases insufficient dressing room space for accurate hanging and checking of equipment are found in these schools.

4. The economic factor also contributes to the neglect of equipment. Laundering, dry cleaning, purchase of maintenance supplies, sending equipment for reconditioning and repair many times are not considered in the budget. Hence when the season is completed there is not sufficient money to care for the needs of their equipment. As a result a great deal of equipment is discarded and replaced before the expected service has been completed.

5. Improper training at the professional level. Many of our institutions of higher learning have not offered

courses in their curricula dealing with purchase, care, maintenance and repair of athletic equipment. When their graduates go out into the field they do not have the background and information to properly care for their school's equipment.

Purpose of the Study. The money spent on athletic equipment in the high schools of Oregon has reached large proportions. With the increased interest and participation in athletics, it seems probable that this expenditure will increase. With growing sums of money being funneled into equipment purchases, good business practice demands that more attention be paid to care of equipment and organization of a sound equipment program.

The purpose of this study is to consolidate available information on the problem of equipment organization. The following phases of the equipment problem will be discussed: The purchase of equipment, care of equipment during the season, care of equipment between seasons, including the customary types of equipment used in baseball, basketball, football and track. It is hoped that the study will be valuable to high school coaches and other school personnel in the schools of Oregon.

Also included is a bibliography to which coaches may refer for additional information about any phase of this

study which may be of particular interest to them.

A secondary purpose of the study is to stimulate thought on the equipment problem among coaches of the state, in the hope that organization of the program will become more definite in the use of more businesslike practices in the schools.

Sources of Data. Material for this study was secured from four sources; books, periodicals, pamphlets, and personal interviews with people familiar with the care of physical education supplies.

Physical education books as noted in the bibliography served as an important source of material. However, information from this source is limited since there has been but little work done on care of equipment. A book, Purchase, Care and Repair of Athletic Equipment, by Kenneth L. Meyer, served as a valuable reference. The study made by Mr. Meyer was the first thorough one to be made on the care of physical education equipment.

Periodicals such as the Athletic Journal, Scholastic Coach, Journal of Health and Physical Education, and School Board Journal provided much helpful information, on the purchase and care of equipment. It was discovered that articles written since 1942 were of the greatest value. There are probably two reasons for this; first, a great deal

of thought and study on conserving equipment was done during the war years; second, so much money is being invested in athletic equipment that improved methods of care, maintenance and storage are found necessary.

The manufacturers of athletic equipment were contacted for information relative to their construction and care and a limited amount of information was received. The most valuable material received from this source was on the construction and care of athletic shoes. This was of great value since most schools are not doing a good job in the care and maintenance of equipment. Most people in the field have a poor knowledge of materials used in equipment, do not have a scientific purchasing plan in their school and spend but little time in planning and caring for the storage of their school's equipment.

Treatment of Data. An attempt has been made in this study to present information on the purchase and care of physical education equipment which will be helpful to the high school coach and physical education personnel in the state of Oregon.

Because of the need for careful planning in purchase of equipment, and because of the many factors involved in purchase, a chapter was written concerning this area. Chapter II on Purchase of Physical Education Equipment deals

with some of the important phases of this problem; general purchasing policy, quality of materials, color, quantity, sizes, and how, when, and where to buy. Also a set of guiding principles covering many phases of the purchase problem has been developed as an aid to those responsible for the purchase of physical education equipment.

Chapter III, Fabrics Used in Physical Education, is presented with the aim of giving a background on the qualities of fabrics. On the market today are many new materials and combinations of materials such as cotton and rayon, wool and cotton, whipcord, sateen and nylon, and it is important that the coach have an understanding of the basic qualities of these and other materials in order to buy wisely.

In the chapters on care of baseball, basketball, football and track equipment the factors of maintenance and repair, care during the sports season and between seasons, storage of equipment, cleaning and laundering are discussed. Each individual item of equipment used in the sport is treated with regard to the above factors.

CHAPTER II

PURCHASE OF PHYSICAL EDUCATION EQUIPMENT

General Policy. The purchase and care of equipment for high school athletics represents one of the major problems confronting those in charge of the program. In most schools funds are limited, squads are as large as facilities and equipment will permit, and safety precautions require the purchase of the best quality and design of merchandise for the money available. Often it is impossible to buy that which is needed, but only the amount of supplies for which there are sufficient funds.

The buying of athletic equipment should not be a haphazard affair. There should be a regular time and procedure for this important transaction. Items never should be bought just because they are cheap, unless they meet standard specifications, nor should they be bought from unknown firms. Experience will show that recognized and legitimate sporting goods dealers are the safest ones from which to purchase materials. They need not necessarily be local merchants but if athletic supplies can be bought as cheaply from them as from anyone, they should be given the business.

Regular inventories at the beginning and finish of each sport season should be maintained. Purchase orders or requisitions should be on regular forms for that purpose and

authorized by the proper school authority, whether it be the coach, athletic director or principal.

Some of the suggestions in the preceding paragraph may seem far-fetched as far as the small school is concerned. Actually this is not entirely so. There is every reason for the small school to be businesslike in its athletic purchases. Usually there are less funds, proportionately, and equipment has to be used longer. Also, the more frequent changes in administration in small schools is an even greater reason why athletic purchases and the handling of funds in connection with them should be entirely clear and justified.

In some situations it may be advisable for small schools to pool their purchases of supplies on a county basis in order to get more advantageous prices. Generally it is safe to advise that equipment be purchased with school athletic association money in the same careful way that one's personal funds would be used.

Hughes and Williams summarize five fundamental principles for purchasing athletic equipment.

> 1. Equipment purchased should conform to specifications; it should be official and should be suitable for the service for which it is intended.
>
> 2. Prices should be consistent with market conditions.

3. Purchases should show consideration of the needs of all activities.

4. Every purchase should show that the interests of the school have been preserved.

5. Every purchase should be made on regulation forms and in such manner as will insure legality of contract, prompt delivery and payments, and efficient management.[1]

Quality and Specifications. It is highly desirable that the coach have an understanding of the quality and specifications of athletic merchandise. For example, he should know the detailed properties of fabrics, such as that the outstanding property of nylon is water-resistance. This indicates that football pants of nylon can be worn on a wet day and still look good after cleaning. A detailed study of fabrics will be dealt with in another chapter.

Many schools purchase materials on the basis of established specifications. A definition of the word "specification" as related to athletic equipment is; "A written or printed description of work to be done, describing qualities of material, mode of construction and dimensions, with any other information pertinent to the construction of the item under consideration."

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1. Hughes, W. L. and Williams, J. F. Athletics in Education. p. 169-170.

Color Fastness. Physical education people have had many problems concerning color fastness in athletic equipment. Kenneth L. Meyer offers points on this problem. They are points the coach and athletic director should be aware of when purchasing equipment.

> 1. Color fastness depends upon the properties of the dyestuffs used, and the method employed in combining and applying them.
>
> 2. There is no known process which can positively guarantee that a fabric dyed a certain color will have a true and even, let alone a completely fast, color. Until science overcomes this disturbing fact, the coach cannot expect too much in matching colors and color fastness.
>
> 3. Wool, silks and rayon when dyed will approach color fastness more closely than cotton fabrics. But any fabric will fade after repeated washings or cleanings.
>
> 4. There is no way for the manufacturer to tell what kind of laundering or cleaning process his fabric will be subjected to. The coach cannot expect a red jersey to be more color fast than a royal blue jersey.[2]

Quantity and Size. How much to buy will be governed by the budget, size of the squad, size of the individual personnel and the needs of a given sport for the coming season. It should be the responsibility of the coach to

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2. Meyer, Kenneth L. Purchase and Care of Equipment. The Scholastic Coach. p. 14.

make a thorough study of his equipment needs, and know specifically what items are needed and the quantity of each before the order is placed. The main caution to be aware of is on special orders. There are two types of special orders. One is the special order for the giant tackle or midget back, concerning sizes of equipment. The second type of special order deals with the design and trim of uniforms for the squad. The important thing here is that special order equipment cannot be exchanged. Every dealer likes to give the school a good exchange service, but they cannot be responsible for a set of game uniforms made to special order for a specific school. The dealer will exchange stock materials gladly, because they will "move" for him. It is good practice where it is financially possible to do so, and especially in the larger schools, to order a few extra pieces of each item of equipment so they will be readily available when needed during a game. It is often economical to "stock up" when the market is low during the "off" season or on close outs.

The ordering of proper sizes is as important as the quantity. This will require considerable planning and thought on the part of the coach. The best procedure to follow is to obtain factual data on the anticipated squad

number, and determine as closely as possible for what players to order.

Boys seldom know their sizes, especially for shoes, helmets and pants. The best plan, then, is to measure, and have the boys try on the dealer's samples in the various sizes. Here it is advisable to have an agreement with the dealer to exchange sizes so each boy is properly fitted. Shoes are difficult to fit and in situations where the school does not supply them, boys should be instructed that shoes come in half sizes and have last markings C, D, E, which signifies the width of the shoe. Generally boys purchase shoes which are too large and they should be cautioned against doing so. After boys have purchased their shoes the coach should check them for proper fit before they are worn. Where the school supplies shoes the problem of proper fit is less serious, as there is a supply from which to choose an adequate fit.

A good procedure to follow in measuring for uniform sizes is to measure the waist with a tape and add six sizes to obtain the jersey size. For example, a boy with a 30-inch waist should wear a size 36 jersey. Modify this in the case of football jerseys and add ten sizes. This is necessary due to the use of shoulder pads. In some cases it is advisable to add specifications necessary in ordering football pants.

For example, "long" for the rangy athlete and "short" if a shorter leg is desired than the standard length.

When and Where to Buy. The average coach has many demands made on his time, and when he does the buying, which is true in most schools, he sometimes delays in placing his orders and then sends through a rush order at the last minute. It is reasonable to expect that the manufacturer can turn out better merchandise when his factory operates on a regular schedule. An order placed late may also result in its late arrival and consequently it won't be available for the start of the sports season. By ordering early the coach can be more certain of a selection of sizes for proper fit than if he waits. It is therefore necessary for purchases to be made early.

Since the coach receives the blame for poor buying, he must select the dealer who he feels will give him what he wants. The three basic requirements of a good dealer are expert knowledge, samples, and exchange service. Many coaches are not qualified to know the best merchandise and new innovations. They therefore must seek the advice of one who knows and one in whom they have confidence. The dealer should present the coach with a variety of samples, including sizes and prices covering all items the coach is interested in buying. The order should then be placed at

that time and not at some future time by reference to the samples he observed in the past. The exchange privilege should be discussed and understood between the two. This is important as it represents the best way to get proper fit.

Guiding Principles for Buying. The coach or person charged with the responsibility of purchasing equipment should be aware of the basic principles involved. He should guide his thinking toward this important duty just the same as he does toward the plans and organization of his practice sessions. The following guiding principles summarize the chapter on the purchase of physical education equipment.

1. Know where the money comes from before the purchase is made.

2. Know what you want to buy. Establish the need through careful planning and thought.

3. Know in detail the purchasing procedure in your school. Cooperate with the principal or other school personnel involved in the purchase of equipment. Make all purchases in writing.

4. Know where to buy. Purchase equipment from reputable equipment firms. Disregard sales pressure. In large schools prepare bids for large quantity purchases, stating the description of what is wanted, quantity, quality and kind. Patronize local dealers if they can render equal or

better service and can compete in price.

5. Look for quality. If one equipment house is considered the best, then buy all equipment there; if not, then divide your purchases.

6. Buy in quantity whenever possible.

7. Buy early in respect to seasons.

8. Always check the price. Demand a price that is consistent with market conditions.

9. Plan your purchases two or three years in advance. This will necessitate the standardization of your equipment; it will insure quicker delivery, easy replacements, and fill-in items can be made each year.

10. Stay away from flashy colors, especially in the lighter shades, unless you can afford new uniforms each year.

11. Avoid mixing materials, such as cotton and wool or cotton and silk. Dyes do not affect different materials the same way, and constant washing and reconditioning of mixed materials give the equipment a faded and dull appearance.

12. Secure the advice of salesmen who are specialists in this field.

13. Avoid discounts and concessions and purchase equipment from well-known firms.

14. Be careful of new or experimental items of equipment. Generally it is best for high schools to leave it to

the colleges to experiment.

15. Keep a running inventory and ledger on all equipment.

16. Return all inferior and defective materials at the earliest possible time, and have the adjustment made.

CHAPTER III

FABRICS USED IN PHYSICAL EDUCATION EQUIPMENT

Qualities of Fabrics. A fundamental principle in equipment purchasing is that it is economical to buy for quality. A large portion of equipment is composed of fabric materials such as wool, cotton and rayon. It is therefore important that the coach have an understanding of the qualities of each of the fabrics, and know which fabric is best suited to the equipment of the various sports in order to make intelligent purchases.

Cotton. Cotton is without doubt the most commonly used of all fabrics in construction of athletic equipment. It is sold under a wide variety of trade names such as airplane cloth, gabardine and whipcord. Cotton does not have the wearing qualities of wool but because it does not shrink or felt together it can be used in many more items of equipment than wool.

The process of mercerization and the quality of cotton are discussed by Annabell Turner in the book, Sewing and Textiles.

> The process of mercerization subjects the cotton material to chemical action of caustic alkali. The material undergoes a peculiar modification, changing from the flat, twisted ribbon-like shape to a smooth, rounded, cylindrical fiber with thickened cell wall. The tensile strength is greatly increased.

> Mercerization imparts a high luster to the cotton fiber due partly to the fact that the fiber, being cylindrical, reflects the light instead of absorbing it.
>
> The firmness of the weave and the quality of the fiber are always important factors to consider. To judge the quality of the fiber, untwist a thread of the cloth and notice the length of the separate fibers. A long fiber indicates strength and therefore, good wearing qualities, other things being equal.[3]

Gabardine. Gabardine is the name of a weave and not a fabric. It can be made of either wool or cotton, with the latter most commonly used in athletic equipment. The weave gives the characteristic, single diagonal line noted on the face of the cloth. Because of the twist of the yarn and the texture, the cloth wears very well and outlasts similar materials used for the same purposes. The cloth may be mercerized, napped on the back, made water repellent and preshrunk. Uses of gabardine include bathing trunks, raincoats, jackets, uniforms, slacks and sportswear of many kinds.

Nylon. Nylon differs from rayon in that it is of a non-cellulose base. It is made from coal, air and water; that is, the elements carbon, hydrogen, oxygen, and nitrogen.

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3. Turner, Annabell. Sewing and Textiles. p. 38.

Nylon has extremely high tensile strength. When dry it is stronger than silk. When wet, nylon loses only about 12 per cent of its original strength, which is completely regained when dry. Because of its strength, nylon is used for fishlines, racket strings and is popular in football game pants. Nylon does not deteriorate with age.

Nylon has lower absorbency than silk; the total water absorbency of nylon is 3.5 per cent of its weight, less than any other fiber. This water resistancy accounts for its use in football pants. Little absorption takes place in nylon, therefore it is not widely used in basketball trunks as profuse sweating takes place in this activity.

Dirt particles do not cling to nylon because of its smooth surface. It can be easily washed, no special precautions being necessary. Nylon's fast drying quality, which is the result of water resistance, is of great advantage. Nylon dries thoroughly overnight, and wrinkles very little.

Rayon. The cellulose base for the manufacture of rayon is obtained from wood pulp or cotton linters, which are the short brown fibers left on the cotton seed after the first-time ginning. Wood pulp for rayon comes from spruce, pine or hemlock chips. Rayon fibers when burned will react

similarly to cotton fibers in that they will burn quickly and leave an ash.

Rayon, because of its sheen, can be made into attractive pieces of equipment. It is used mostly in basketball trunks and warm-up jackets. The greatest disadvantage of rayon or partial rayon materials is that it will shrink unless carefully and properly handled. The manufacturer's instructions on cleaning should be closely followed.

Sateen. From the construction standpoint sateen is the same as satin. The term is used to specify that the cloth is made of cotton and not silk or rayon. Cotton sateen is a well-mercerized cloth made of satin weave. The glossy finish is the outstanding characteristic of this plain or printed material. The cloth is durable, substantial, keeps permanent luster, is attractive, but has a tendency to wrinkle and roughen. It is most commonly found in jerseys of either football, basketball or track.

Satin. Satin is a term which signifies that silk or rayon has been used to make the fabric. Satin weaves are used to make satin and sateen. When compared with the other two basic weaves, plain and twill, this weave does not have the tight interlacing of yarns or threads.

Satin may be recognized by its glossy, smooth, soft-feeling surface. This appearance accounts for the remarks

of many coaches that any "shiny" basketball trunks are satin. However, there is very little actual satin material used in athletic equipment.

Some of the characteristics of satin are excellent draping qualities, durability, launderability and slipperiness. The cloth is difficult to manipulate because of its slipperiness.

Twill. Twill cloth shows tightly twisted yarns which are used to bring out the diagonal effect of the material. This compact manner of construction results in a strong, durable cloth which washes well. The diagonal effect can be plain or varied, and gives a smooth "shiny" finish in appearance. The construction of twills from tightly twisted yarns results in fabrics which prove practical for garments to be given hard wear. This accounts for its popular use in football pants and jackets.

Whipcord. Whipcord, like gabardine, is a weave and not a fabric, and can be made of wool, cotton, or rayon. The yarn in whipcord is bulkier and the weave more coarse than in gabardine. The cloth is lower in texture and heavier in weight, ranging from 12 to 20 ounces more per yard than gabardine. The material is exceedingly durable, rugged and stands hard usage and wear. It will become shiny in time with wear. Whipcord is commonly found in

football pants and jackets.

Wool. Woolen goods are being used to a lesser extent in athletic equipment than previously. However, many coaches desire it, especially in football jerseys. There are several advantages to woolen goods. It is durable and has long wearing qualities. Woolens take color very well and color combinations can be attractively arranged. Woolens hold their shape well and absorb moisture. Elasticity is one of its most important qualities. However it has the disadvantage of shrinking.

> In the washing of woolen goods there are four factors which must be controlled: Moisture, heat, alkalinity and mechanical action. Moisture is the most important of these since it is only when moist that wool displays its characteristic ability to felt. Moisture increases the elastic properties of wool, so that under the influence of friction or mechanical action the fibers travel, actually move about in the fabric until they become tangled and matted. The presence of soap or alkali or heat increases this tendency to felt but it is the mechanical action on the wet wool which actually produces the felting.[4]

As a fabric felts or mats, the material gets hard and thick; consequently it must shrink in length and width. In the washing of woolens only mild neutral soaps are used by

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4. "The Felting of Wool". Textile Notes, American Institute of Laundering. p. 1.

professional laundries and temperatures are kept at 100 degrees Fahrenheit or below.

How to tell wool from cotton is always a problem confronting the buyer. The "Ivory System" which reconditions athletic equipment gives one test which could be used to determine the type of fabric:

> One simple test is to take a piece of fabric in question, and strand it down so that you can examine the individual fibers. Touch a match to a cotton fiber and it will burn quickly with a yellow flame and burn up completely.
>
> A woolen fiber will burn with a bluish flame and congeal, giving off a fatty odor. A hard, charcoal-like residue is left. Wool fibers curl up like a spring, and cotton fibers are straight when you separate them from the fabric.
>
> As one handles fabrics, over a period of time, he gets to recognize cotton and pure wool without having to conduct any test, simply by the eye, or by the feel, or by the way they take dye.[5]

Many fabrics used in athletic equipment today are a combination of wool and cotton and it is impossible for the average coach to know how much cotton or wool is in the fabric. He has to depend entirely on the honesty and integrity of the company from which the goods are being purchased.

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5. Lynch, T. E. "Some More Questions Answered". The Observer. p. 5.

CHAPTER IV

CARE OF PHYSICAL EDUCATION EQUIPMENT

General Policy. Next to the actual work of coaching his teams, the care of equipment should require more time of the average high school coach than anything else he is called upon to do in connection with his athletic work. It should be the duty of every coach to plan and organize his school's athletic supplies in such a way that the greatest amount of service and economy will be realized.

There are really only two reasons why equipment has to be replaced; it either wears out or it is stolen. Failure to care for and repair equipment properly or at all, allows the material to deteriorate. It wears out much more quickly than it should and the school does not get the use of normal life of the article. An adequate, well-planned system of checking equipment out and in, combined with the safe storage room, will do much to decrease the loss from thievery. Clean, well-fitting equipment and adequate playing facilities which are well kept are motivating forces in limiting loss of supplies from this source. Students have a responsibility to the school in properly caring for supplies issued to them. The coach can do much toward developing in the student an attitude of respect and appreciation for school equipment and facilities. If the coach fails to do so he is missing a

fine opportunity to teach an important part of citizenship.

Proper equipment provides better protection, and if cared for correctly, it will save the squad from losing many players through injuries and infections. Clean supplies and sanitary dressing rooms offer an opportunity to practice and teach health in the athletic program. The use of athletics as a laboratory for the health program should be included in the planning as many health practices can be put into actual use.

John Strell, Jr. makes the following remarks concerning the cleanliness of equipment.

> A cardinal principle to follow in caring for all types of equipment, particularly fabrics and leather goods, is: KEEP YOUR EQUIPMENT CLEAN. This rule has a dual purpose. First, it aids in preserving equipment; and second, in cases of wearing apparel, it protects the wearer's health.[6]

This chapter is devoted to the specialized care of equipment during the sports season and between seasons, and should be helpful to both the student manager and coach.

All players should be urged to report immediately all equipment that is in need of repair. This should be done daily, and repairs made before re-issuing. It is neither

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6. Strell, John, Jr. "Care of Equipment the Year 'Round". The Scholastic Coach. p. 34.

practicable nor economical to wear a piece of equipment until it is so far gone that it must be replaced by new. Arrangements can usually be made locally, to make minor repairs overnight, either through the shoe repair shop, harness shop, or the school's home economics department. At the end of the season have all equipment returned at once. Do not throw it in a pile and forget it, or delay in sortin it over. Check it over immediately and that which is worth saving have cleaned and repaired at once. Destroy that which is not worth repairing.

Balls. All balls should be kept properly inflated when in use with a source of air pressure that can be checked by a gauge. Inflate only to the specified pressure stamped on the ball. When inflating rubber valve balls, dip the needle in glycerin which helps keep the valve from being ruptured during insertion. If moistened with the mouth, the needle should be wiped dry after using to prevent rust. A rusty needle is damaging to the valve of the ball. The valve is delicate and daily inflating and deflating of the ball should be avoided. This causes wear on the valve and necessarily shortens the life span of the valve. Instead of using the needle and gauge each time, the coach should use the bounce test for checking balls for practice. Another point is that the continual flexion of the linings and seams

increases the possibility of rupture of the ball. It is advisable when storing balls to have only enough pressure to relieve the tension on the leather. When stored deflated the ball buckles in the middle and produces an added strain on the lower seams. Molded balls come from the factory inflated; therefore it is recommended they be left inflated.

All balls must be kept clean. How often basketballs should be cleaned depends on the cleanliness of the floor where the balls are being used. An application of saddle soap or liquid ball cleaner at least twice a week is suggested. Footballs must have all mud and lime removed, an application of saddle soap, then allowed to dry in a room at normal temperature while inflated. After drying a penetrating mixture such as neatsfoot oil should be used. Balls should not be allowed to dry in a room of high temperature. Sudden drying may cause the seams or lacings to break.

The coach can do much to help prolong the life of balls by instructing the participants in their proper use. Caution them against conditions that cause excessive wear such as throwing footballs against a fence, building or on a gravel surface, and basketballs against the gymnasium walls.

Metal Equipment. The problem of caring for metal athletic equipment is not nearly as involved as other areas

of this study. However, they too are expensive and should be checked and s tored just as other materials are cared for.

The metal discus and shot should have the name of the school stenciled, as a means of identification. In meets where there are a large number of participants it is easy to get the equipment mixed with that of other schools. Care should be taken that all metal supplies be checked into the equipment room after each practice; if left out in the weather they will rust. At the season's end the discus and shot should be sandpapered, making certain all rust spots and dirt are removed, then an application of oil and stored away in designated places. If the interior of the discus is of wood it should be given one or two coats of shellac, depending on the condition of the wood.

A valuable item of any athletic department is a measuring tape and too often it receives the least consideration regarding care. Every few weeks the steel tape should be cleaned with gun emery paper, wiped thoroughly, oiled and stored in its proper place in the supply cabinet. If the steel tape is used during wet weather, it should be cleaned before putting away.

A steel javelin should be hung from the tip with the point hanging downward to prevent it from bending. It should be cleaned as desribed above for steel materials.

Other metal equipment such as starting blocks, cross bars and vaulting poles should be cared for in the same manner and in addition painted where necessary and stored in their proper place.

Protective Equipment. Helmets must be cleaned and stored properly if they are to give the service normally expected of them. Mud or excess dirt should be removed from the leather or fiber crowned helmet with a stiff brush--do not scuff the surface if it can be avoided.

Care should be taken in drying helmets. Wire helmet forms or a long rod passed through the ear holes in the helmet with the rod then suspended above the floor are good methods of drying helmets. This allows the helmets to assume a normal position. Do not hang the helmets by their chin straps, as it pulls the ear pieces together and ruins the fit. It is recommended that the school send its helmets to a reconditioning firm for cleaning, since most schools do not have the facilities or equipment necessary for this type of work. Also most laundries and dry cleaning establishments are not equipped for this work. However, a limited amount of cleaning can be accomplished by the use of ordinary soap and water and light brush. The reconditioner sterilizes the helmet, and this is the safest sanitary procedure.

There are special helmet paints and lacquers on the market. A good leather lacquer should be used. A very light-weight shellac may be used for a finish over the lacquer. This can be attractively done in the school colors if desired. Care should be taken that the helmets are cleaned well before applying the lacquer. If commercial paint is used a heavy coat should not be applied as it tends to crack and chip off. It is well to shellac over the paint as it will act as a further protective coating for the fiber as well as the paint.

After cleaning and before storing, check the chin straps and replace if necessary. Check the suspension straps, the stitching on the helmets and any serious dents on the crown. It is economical to have these repairs made by athletic reconditioners. Small dents in the fiber crown can be pounded out if wetted. The coach should be responsible for seeing that all helmets are in good condition and offer the best possible fit and protection to the athlete.

When these steps have been followed the helmets should be tagged for size and renumbered, according to the numbering system in use. They should then be s tored in a dry place, preferably in built-ins or in covered boxes to avoid dust. Kenneth Meyer suggests five methods of storing

helmets. They are:

1. Use of wire helmet forms.
2. Use of rod through ear holes.
3. Replace in individual boxes.
4. Place on back piece, resting on ear pieces.
5. Place on crown provided the helmets are covered to prevent dirt entering the crown.[7]

Plastic helmets are becoming popular and widely used. The manufacturer should be consulted concerning any repair necessary. Check the cantilever suspension for damage and the moldings for cracks. If it isn't lined but has only the web suspension it can be washed with ordinary soap and water.

There are some factors which the squad should be informed of regarding the care of their helmets. Helmets shouldn't be sat on and should not be thrown carelessly to the sidelines because it loosens the ear pieces and might dent the crown. They should not be stuffed in duffle bags because of crushing. If duffle bags are issued each individual player for trips, the socks, clean "T" shirt and sweat shirt should be placed inside the helmet to aid in holding its proper shape.

Shoulder pads, hip pads and blocking pads should be

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7. Meyer, Kenneth L. Purchase, Care and Repair of Athletic Equipment. p. 108.

checked a number of times during the season for broken stitches, cracked fiber, torn elastic straps, broken laces, pulled eyelets and other items that will necessitate replacement or repair. Players can cooperate by reporting to the coach the condition of their equipment. If these minor repairs can be made during the week, not only will there be less repair at the season's end, but there will be less chance of equipment going wrong during the game.

Again it is advisable to have all pads in need of repair sent to the reconditioners at the end of the season. In the cleaning of pads Mr. Meyer has summarized for the coach the procedure to follow.

> The padding--felt, kapok or sponge rubber--may be washed with a mild soap and water. Press out all excess water from the padding. When hung to dry, the padding should be faced out and kept away from metal hooks. (Wooden pegs make good drying hangers.) Padding should then be dried at room temperature. Fiber, laminated paper, can be reshaped when wet if necessary. After being dried the fiber should be treated with shellac, varnish, wax or some protective coating. Actually fiber has little resiliency (that act or power of springing back to a former shape or position). A protective coating helps to prevent scuffing and disintegration of the fiber.[8]

After the pads have been cleaned the leather connectors should be oiled before storage. Neatsfoot oil is

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8. Ibid. p. 106.

recommended for this use. Oiling the leather parts is especially important if the pads have been cleaned in water; otherwise they may crack and eventually break off, or pull out.

The pads should then be numbered and stored away in a dry place, free of dust. Many schools use the "hall-tree" method of storing shoulder pads, the pole serving as a basis for holding the pile of pads in a vertical position. It is important not to pile more than ten pads on one tree as those on the bottom are apt to be forced out of shape by the weight. The lacings should be loosened and elastic retarded on shoulder pads before piling on the tree. Do not throw pads in a bin or hang the pads by the elastic straps. Hip pads should be stored with the padding up, and not over ten should be piled in a single stack.

Other fiber equipment such as shin guards, thigh guards and injury pads should be treated with a coat of shellac, varnish or wax, numbered and stored away. Care should be taken in storing miscellaneous pieces of equipment, so that the coach knows where they are located. They should be easily accessible for use.

Rubber Equipment. Basketball shoes are generally rubber soled with canvas uppers. Cleaning of this type of

shoe is important because profuse sweating causes it to rot out at the welt, where the rubber and canvas are joined. Another important reason for periodical cleaning is for sanitary reasons. If not cleaned, the shoe will carry an odor, especially in the drying room and dressing room. Canvas upper shoes can be cleaned with soap and warm water, using a brush both inside and out and allowed to dry in room temperature. Formaldehyde may be added as a deodorant. However caution should be exercised since it may burn the feet. Care should be taken that the shoe is rinsed well after use of the soap and water.

When the season is over the shoes should be tagged for size, checked for repairs, especially the eyelets, and stored away on shelves in a dry place.

Rubber basketballs should be cared for in a fashion similar to that discussed under care of leather balls, except they should not be cleaned with oil.

Foam rubber padding sheets are a valuable item in the supply room for the care of injuries. When stored they should not be piled on top of each other to any great height, nor should they be subjected to any pressure while in storage, since this will decrease the thickness of the rubber.

Shoes. Most coaches and equipment managers are agreed that shoes are one of the most important items of an athlete's equipment. Therefore it is important that a good quality of shoe is purchased and that it receives the best possible care.

In the selection of leather shoes, the uppers should be of medium weight, preferably kangaroo. In less expensive shoes the uppers are generally constructed of elk or horsehide which, though not as pliable and form fitting as kangaroo, are still serviceable leathers and stand up quite well. Insist on a shoe with a leather counter. Cheap shoes with a fiber counter will break down under wet conditions and can never be restored, whereas a good leather counter, though it may be somewhat out of shape, can be restored to its original condition by an athletic shoe rebuilder.

A pamphlet published by the Mercury System, specialists in athletic shoe rebuilding, offers some excellent information on the care of leather shoes during the season.

> A new shoe is generally soft, flexible and has good eye appeal. The extremely hard usage to which football shoes, for instance, are subjected, soon takes its toll unless certain precautions are taken. It is a good policy before issuing new shoes to treat them with a good grade of oil such as "Mercol" or neatsfoot oil, the former a product of Mercury System, used and recommended by us. Shoes should be treated inside and out, oil being

applied with a brush or swab and then allowed to set overnight. This treatment may be repeated two or three times in the course of the season. However, do not oil muddy shoes without first cleaning off all mud, as the result will be a gummy coating which will adhere to the leather. Cleaning may be accomplished by the use of a wire brush and dull scraper on the bottoms, care being taken not to use a sharp instrument which may cut the uppers. Uppers can be cleaned with a stiff corn or bristle brush and a damp cloth. Rub surface oil into the shoe with the hands and be sure to allow to set overnight or longer so that there will be no surface film to attract mud and dirt. Good judgment should be used in the application of lubricants to leather. Too frequent applications will result in a soggy, heavy shoe. Insufficient treatment will result in a dry, brittle shoe which will rot, crack and shorten its serviceability. The aim should be to maintain the original condition of the shoe as closely as possible.

. . . . . .

Use soft braid laces which will pull freely through the eyelets of the shoes so that they will not tend to tear out of the leather. Check cleats frequently and change cleats which are badly worn to prevent damage to the metal inserts. Keep individual pairs of shoes tied together so that they will not become mismated. Do not attempt to dry shoes at higher than room temperatures as this has the effect of cooking the leather. Keep shoes free of mud which causes drying out of leather oils. Never throw wet shoes in a pile, but spread out in an airy room with good light and ventilation. Throwing shoes into a dark corner will encourage mold and cause great damage to the leathers besides crushing counters, etc. In short, athletic shoes should be given the same care you would give your best street shoes.[9]

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9. Consentino, Frank J., and Lacolla, Vincent J. Selection, Care and Maintenance of Athletic Footwear. p. 1-2.

Extreme care must be taken to see that a wet shoe is not dried too rapidly. Do not let the players wear wet shoes day after day if it can be avoided. The shoe last will be distorted, as the leather will naturally stretch more when wet. Drying may be aided by placing crushed newspaper in the shoe. Or, fold the tongue back over the toe of the shoe. Normal constant heat is stressed because when wet, leather loses its natural oils.

Cleats should be checked often and when found to be wearing on one side of the shoe, either a new set should be installed or, if not worn too badly, they can be changed around on the shoe. When exchanging cleats be s ure the cleat is not "cross-threaded", and do not screw it on too tight. It is also advisable to oil the cleat post when replacing cleats to a void rust. Athletes should not walk from the dressing room to the playing field with cleated or spiked shoes. Exposure to hard surfaces takes many hours service off the life of football cleats, spikes in track and baseball shoes.

Uniforms. Most baseball uniforms are pre-shrunk wool flannel and vary in weight. However there are some cheaper fabrics such as mixed wool and cotton flannel. Woolen goods should be sent to the cleaners as soon as they are turned in by the players. Dirty woolens are the most liked food of

moths, and no chances should be taken. Grit and dirt also grind the woolen fibers, causing them to break, thereby shortening the life of the garment. Cleaning of woolen materials should be left to experienced cleaners. However, the coach should be aware of two important phases of the laundry process. First, if the water is the least bit too hot, shrinking results. The temperature should not exceed 110 degrees Fahrenheit. Second, soaps containing desturctive chemicals should not be used as they destroy the fibers.

If a mothproofing process has not been used by the cleaners, woolen goods should on their return be placed in moth proof cabinets if available. Moth flakes should be spread on the shelves and between all garments. When sent to the cleaners it should be specified that all garments are to be repaired. When returned this work should be inspected before storing as all stored equipment should be ready for issuing the next season. Baseball caps, stockings, shirts and pants should be stored in built-ins or in boxes which can be sealed tightly, and the contents noted on the outside so they can be easily identified.

Basketball and track jerseys are usually made of knit material and are available in the following fiber combinations; rayon and cotton, rayon and durene, rayon and

worsted, worsted, cotton, worsted and cotton and a variety of trade names such as elastoknit.

Basketball and track pants are usually of the following fabrics: Tackle-twill, nylon, jockey satin and army whipcord. Basketball warm-ups have in the past been made of wool material but nylon, satin, tackle-twill and other fabrics are being used more and more. Warm-ups for track are generally of cotton in medium and heavy weights and are fleece-lined.

The cleaning of materials used in basketball and track uniforms should be left to experienced hands. Almost all fabrics are accompanied from the factory by cleaning and laundering instructions. These should be kept and made available to the cleaning establishment which does the school's work.

During the season, knitted goods which have become wet through perspiration should not be stacked one on top of the other. Colors may bleed from one garment to the next. Neither should they be wrung out. The tendency in wringing these goods is to twist them out of shape. After each day's practice and after games, uniforms should be placed in the drying room and allowed to dry thoroughly before use the next day. Jerseys and pants also must be checked occasionally for snags and rips. These cause runs, especially in

jerseys. It is better to place game uniforms between games in built-ins rather than open shelves as they will be protected against dust. Clean game uniforms are important both from the standpoint of sanitation and appearance.

At the season's end all jerseys, pants and warm-ups should be checked for repairs, then sent to the cleaners. Uniforms for each sport should be stored together according to size. It is also good to make a record of all the sizes and numerals of the garments before putting away. This information will be needed to supplement the stock with new uniforms. All materials when being stored should be sprinkled freely with moth crystals or moth balls. Although moths will not attack cotton fabrics the application of moth repellents will keep the mice away.

Football jerseys are of two types, practice and game. The practice jersey is usually of light or medium weight cotton material. Popular fabrics for game jerseys are wool, cotton, rayon and nylon. There are numerous combinations of the above. The care of football jerseys presents a greater problem to the coach than basketball or track jerseys. They receive extremely hard usage and are exposed to wet and muddy conditions. C. E. Stevens makes the following suggestions concerning the care of football

jerseys during the season.

> 1. Game jerseys should be cleaned at least one a week. Wash woolens in lukewarm water, 110 degrees F. Rinse in water of the same temperature.
>
> 2. In washing jerseys do not rub them; dip them in and out of lukewarm water containing a good quality of soap flakes.
>
> 3. All holes must berepaired as soon as they appear.
>
> 4. Practice jerseys should be washed at least twice a week.
>
> 5. Cleanliness and neatness of the football equipment for games is essential.[10]

Football pants are likewise of two types; practice pants and game pants. Practice pants are generally of canvas or cotton duck material. They are easily laundered and of rugged construction. Game football pants are made of such materials as nylon, tackle-twill, rayon and cotton duck. Many game pants have knit backs which may be of wool material or some combination such as rayon and cotton. Another type of back is the "two-way stretch" which is made by weaving a fine latex or rubberized thread in with rayon fibers. This type back is becoming very popular. Almost all football pants today are "shell", meaning they do not

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10. Stevens, C. E. "Care of the Leather and Wool in Athletic Equipment". Athletic Journal. p. 19.

have the protective pads constructed in the pants. Shell pants may or may not have knee pads constructed in them. It is best to have pants with detachable knee pads so they can be removed for laundering. A long drying process is necessary when kapok pads are built in the pants, whereas if they can be removed it takes only a short time for the pants to dry after washing.

In laundering and dry cleaning football jerseys and pants it is advisable to follow the instructions of the manufacturer, and pass this information along to the persons engaged to do this work. The coach however, should give special attention to the laundry of elastic two-way stretch pants. The material should be washed in lukewarm water and not dry cleaned, since cleaning fluid has a tendency to disintegrate the rubber yarn. In regard to cleaning jerseys and pants the following suggestions may be helpful. The garments should be cleaned immediately after each game. Practice pants should be laundered at least once every two weeks. It is a good idea to place the garments in clear cold water immediately after the game, especially if the uniforms are muddy. This prevents the setting of the perspiration and dirt, and any running of the colors. Inseam and outseam measurements on football pants should be taken

prior to cleaning and passed on to the cleaner, so that after the garments have been cleaned and are ready for pressing, they can be stretched back to the original specifications. Care should be taken that wet football equipment not be allowed to remain in lockers, because it mildews quickly while in this condition.

In storing football jerseys, pants and parkas, the procedure described for use with basketball and track uniforms should be followed. In addition, it is well to store all practice pants in a specified place according to size, the same for game pants and jerseys. In schools where two or three squads are operated it might be advisable to store the equipment according to squad. For instance, all varsity equipment should be in one location, junior varsity in another and the freshman equipment in still another.

Athletic supporters and other articles made of elastic yarns should not be boiled when laundered because it deteriorates the fiber. They should be dried carefully and kept in a cool place. Rubber padded articles should not be stored in hot rooms lest the rubber lost its resiliency.

Wood Equipment. Hurdles, benches, toe-boards and take-off boards should be repaired as needed at the end of

the season and painted. Hurdles are expensive and often become damaged. They should be kept in repair at all times. All bolts and metal parts should be painted to prevent rusting. They should be stored in a dry place and not left out in the weather.

Javelins and vaulting poles of wood should be given a protective coat of varnish and hung up to prevent warping.

Jumping and vaulting standards should be repaired as necessary, painted or shellacked and stored in a dry room.

Wood has a tendency to deteriorate from the effects of moisture. Therefore, it is a good policy to apply a protective varnish to wood equipment every six weeks.

Miscellaneous Items of Equipment. Baseball bases can be made to last longer if they are kept clean and brought in every evening after practice. Keep them out of the rain whenever possible. At the season's end they should be painted with a good canvas paint, and stored with other baseball equipment.

Football blocking dummies should be removed from the field each day and stored in a dry place. They are difficult to dry if allowed to get wet and they will also rot out at the base of the dummy. They should be dried thoroughly and cleaned before storing for the winter.

General Administrative Suggestions for Handling Equipment. Woody Hatfield in the Athletic Journal makes some excellent suggestions in the handling of equipment:

1. Each boy making a trip should have an individual carry-all bag. The protection afforded by this bag will more than pay for the cost. Many suits can be soiled or torn before they are ever used, unless they are packed properly for trips.

2. Keep an accurate record of every item of equipment issued or exchanged.....

3. Do not allow players to wear athletic equipment for street wear, such as hoods and warm-ups. This is a matter of training your boys.

4. Thoroughly dry and air all equipment after it has been used. Wet equipment deteriorates rapidly and loses its shape.

5. Never s tore equipment at the close of the season until it has been thoroughly cleaned.....

6. Have all equipment that is damaged during the season repaired immediately if it is to be put back into service that season.

7. Taping equipment together with adhesive tape is a questionable practice and expensive, to say the least. It may, however, be done in an emergency. Small holes in jerseys may be temporarily mended to keep the hole from spreading by placing a small piece of tape on the underneath side of the jersey to cover the hole.

8. All knitted goods that might be attacked by moths should be stored in boxes with moth flakes or moth balls, and tightly sealed.

9. Carefully train student managers in their duties so that they may assume their share of responsibility. However, do not expect them to do all your work for you.

10. At the close of the school year, leave all equipment in readiness for issuing the next fall. Check carefully the storage of all equipment before leaving school on your vacation. Do not shirk your duty if you happen to be going to a new job the following year.[11]

In summarizing the chapter on care of physical education equipment there are a number of other factors which should be emphasized to the person responsible for supplies. They are:

1. There must be a definite policy in your school and among the coaches regarding the care of athletic equipment.

2. Players must be instructed in the care and use of athletic supplies.

3. The head coach of a given sport should be directly responsible for the care of equipment for that sport.

4. All athletic equipment must be stenciled for size and identification. India ink, stencil paint and colored lacquer are methods most in use in marking equipment.

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11. Hatfield, Woody. "The Present Need for Proper Handling of Athletic Equipment". Athletic Journal. p. 36.

School identification labels are also recommended.

5. If an equipment custodian is employed, there must be a clear understanding of duties and responsibilities between the coach and custodian.

6. Clean towels should be provided as often as needed to maintain a sanitary standard.

7. The equipment should be arranged so that there is a proper place for everything. Supplies when not in use should be stored in their proper places.

Storage Room Recommendations. Storage of equipment is as important to its care as anything we can do to preserve it. It is therefore important to consider some of the needs of an equipment room.

In many cases nothing can be done about its present location or size. The coach can, however, make the most of what is available. The room should be large, but if it is small, then its organization must be planned more carefully. He might enlist the help of the industrial arts department in building shelves, bins and drawers.

Shelves are necessary in the storeroom and they should be enclosed with doors. Some shelves can be constructed of fine guage "chicken" wire. Since this allows for ventilation in the storage of balls. Bins are desirable for issuing socks, supporters and other items. These

are often built under the check-out window. Drawers which pull out and are of tight, dustproof construction are good for storage of all fabric supplies. If built-ins are constructed the shelves should be adjustable, making the space usable for various types and sizes of equipment. It is important that all articles be stored off the floor or they will pick up moisture and will mildew.

Ventilation of the storage room is a necessity to combat the hazards of mildew. When working in the room open the windows for ventilation. If the room is located where there are no windows, a fan may be sufficient.

The storage room must be kept clean. This can be a duty of the managers. Shelves and drawers should be dusted and kept free of dirt. The room should be kept painted and at all times clean and sanitary.

All drawers, bins and shelves should be marked showing the contents of that particular space. For better organization the space can be marked identifying the equipment with a certain squad and sizes can be marked on the outside.

The administration of this room must be business-like. The managers and coaches should be the only people allowed in the room. Printed signs reminding students to stay out

are helpful. Equipment storage rooms are often a loafing place before and after practice. This practice can develop into a serious problem and should be discouraged.

CHAPTER V

RECOMMENDATIONS FOR IMPROVED METHODS OF CARING FOR PHYSICAL EDUCATION EQUIPMENT

The graduate who goes into secondary school coaching in all but the larger high schools must be trained to fill a number of jobs. In many of the secondary schools, the coach will be, in addition to the coach of the teams, the athletic director with his duties of scheduling, budgets, maintenance of facilities, procuring of officials and promoting athletic contests. He will undoubtedly handle physical education classes and intramural athletics. He will also do a good share of the training room activities, such as taping and first aid. Most physical education courses are now covering these varied phases of the athletic program. With few exceptions little attention is being paid to care of equipment in professional schools. All schools offering a major professional curriculum in physical education should allot a certain amount of time to the study of equipment and its purchase and care.

To establish the need for a college course entitled "The Purchase, Care and Repair of Athletic Equipment", Kenneth L. Meyer made a survey in several of the midwestern states. Questionnaires were sent to coaches picked at random and representing institutions of all sizes. Some of

the questions asked and the coaches' answers were:

> "Did you have any such training prior to entering the coaching field?" Eighty-six of the coaches answered "no". Two answered "only incidental in other courses". Of the coaches with a master's degree, only one reported such training on a graduate level....
>
> The next question was, "If answering 'no' to the above question, have you, at any time, felt the need of specialized preparation in problems pertaining to equipment?" To this, seventy-eight per cent of the coaches answered "yes". Three of the coaches said definitely "no". This frank admission of seventy-eight per cent of the coaches queried that they have felt the need for such instruction seems to be valid proof that the need for such instruction is present.
>
> The third question, a follow-up to the above two, was, "Do you feel such a course would be of value to the future coach?" To this, ninety-six per cent of the answering coaches answered a definite "yes".
>
> The fourth question was, "What are some of the items you feel should be included to make the course as practical as possible?" The following is a list of the items most repeated:
>
> 1. Selection of quality merchandise.
> 2. How to care for equipment.
> 3. What one can do a bout repairs.
> 4. How much equipment to buy.
> 5. What constitutes intelligent buying.
> 6. Proper storage of equipment.
> 7. Where to buy.
> 8. Selection and duties of student managers.
> 9. Budgeting.
> 10. Safety of equipment.[12]

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12. Meyer, Kenneth L. "Equipment Training for Future Coaches". The Athletic Journal. p. 46.

Other important phases in which the coach needs training are drying systems, towel systems, marking systems, laundering and cleaning processes and school laundering systems.

In large high schools where several thousand dollars are spent annually for athletic equipment, it may be economical to employ a part-time equipment manager, one whose juties during certain hours of the day would be to make minor repairs to supplies and generally care for the school's equipment. He should be in the equipment room during practice sessions and games and travel with the team on trips. His salary may absorb the difference in dollars saved during the first two or three years, but over a period of years this situation will be reversed when he has created a good used stock and developed a system to gain the greatest amount of service from the equipment.

If the employment of a part-time man is impossible, an attempt should be made through the administration to have a teacher assigned to the equipment room during practice sessions and games to supervise student managers and be responsible for equipment during this time. The teacher could also supervise the dressing room when the players and coaches are on the field.

BIBLIOGRAPHY

1. Ambramoski, E. R. "A New Use for Old Equipment". Athletic Journal. Vol. 23. p. 11. January 1943.

2. Bottorff, Floyd. "The Responsibilities of an Equipment Manager". Athletic Journal. Vol. 30. no. 10. p. 22. June 1950.

3. Brown, O. E. "Equipment Economy". Athletic Journal. vol. 12. p. 16. October 1932.

4. "Condensed Dictionary of Textile Terms". American Fabrics. no. 3. p. 84. 1947.

5. Consentino, Frank J., and Lacolla, Vincent J. Selections, Care and Maintenance of Athletic Footwear. Lawrence, Mass.: Mercury System. 1949.

6. "Dictionary of Wool and Worsted Textile Terms". American Fabrics. no. 5. p. 136. 1948.

7. Erickson, Carl. "The Care of Equipment". Athletic Journal. vol. 26. no. 8. p. 40. April 1946.

8. "The Felting of Wool". Textile Notes, American Institute of Laundering. Textile Note 25. no. 390. sec. 3. p. 1. 1949.

9. Forsythe, C. E. The Administration of High School Athletics. New York: Prentice-Hall, Inc. 1948.

10. Griffith, J. L. "A Course in Equipment". Athletic Journal. vol. 27. no. 6. p. 55. February 1947.

11. _____, "Early Buying Best". Athletic Journal. vol. 19. no. 9. p. 22. May 1939.

12. Hatfield, Woody. "The Present Need for Proper Handling of Athletic Equipment". Athletic Journal. vol.22. no. 7. p. 36. March 1942.

13. Hines, Clarence. "The High School Equipment Room". Athletic Journal. vol. 13. no. 2. p. 14. October 1932.

14. Hughes, W. L., and Williams, J. F. Sports, Their Organization and Administration. New York: A. S. Barnes and Co. 1944.

15. _____. Athletics in Education. Philadelphia: W. B. Saunders Co. 1931.

16. Lamar, Emil. "It's a Steel Hangar!". Scholastic Coach. vol. 16. p. 16. January 1947.

17. _____. "Build Your Own Drying Room". Scholastic Coach. vol. 17. no. 5. p. 28. January 1948.

18. _____. The Athletic Plant. New York: McGraw-Hill Book Co. 1938.

19. "Lexicon of Speciality Fibers". American Fabrics. no. 4. p. 104. 1947.

20. Lynch, T. E. "Brief History of the Ivory System". Observer. 1945.

21. _____. "Cleansing Problems". Observer. 1949.

22. _____. "Safety First". Observer. 1945.

23. _____. "This New Fabric World". Observer. 1950.

24. _____. "Some More Questions Answered". Observer. 1948.

25. Meyer, Kenneth L. Purchase, Care and Repair of Athletic Equipment. St. Louis: Educational Publishers, Inc. 1948.

26. _____. "Equipment Training for Future Coaches". Athletic Journal. vol. 28. no. 6. p. 46. January 1948.

27. _____. "Purchase and Care of Equipment". Scholastic Coach. vol. 18. no. 5. p. 14. January 1949.

28. Mitchell, E. D. Intramural Sports. New York: A. S. Barnes and Co. 1939.

29. Moeller, W. L. "All Students Must Be Considered in Post-War Planning for High School Athletics". American School Board Journal. vol. 109. no. 31. p. 2. September 1944.

30. Mountjoy, J. R. "The Care of Athletic Equipment". Athletic Journal. vol. 18. no. 4. p. 36. December 1937.

31. Nash, J. B. The Administration of Physical Education. New York: A. S. Barnes and Co. 1931.

32. Pulver, H. E. "The Athletic Equipment Room". American School Board Journal. vol. 93. no. 56. p. 58. October 1936.

33. Smith, Tucker P. "Getting the Most Out of Equipment". Athletic Journal. vol. 11. no. 1. p. 46. September 1930.

34. Stevens, C. E. "Care of Leather and Wool in Athletic Equipment". Athletic Journal. vol. 15. no. 4. p. 19. December 1934.

35. Streit, W. K. "Care of Equipment for the Duration". Scholastic Coach. vol. 12. no. 4. p. 14. December 1942.

36. Strell, John Jr. "Care of Equipment the Year 'Round". Scholastic Coach. vol. 15. no. 5. p. 34. January 1946.

37. Sullivan, Kenneth G. "The Equipment Problem". Scholastic Coach. vol. 17. no. 5. p. 38. January 1948.

38. Turner, Annabell. Sewing and Textiles. New York: D. Appleton Co. 1918.

39. Twitchell, P. "The Care of Football Equipment". Athletic Journal. vol. 14. p. 33. September 1933.

40. Voltmer, E. F., and Esslinger, A. A., The Organization and Administration of Physical Education. New York: F. S. Crofts and Co. 1938.

41. Weber, Elmer W. "Management and Care of Athletic Equipment". Athletic Journal. vol. 13. no. 6. p. 36. February 1933.

42. Williams, J. F., and Brownell, C. L. The Administration of Health and Physical Education. Philadelphia: W. B. Saunders Co. 1946.