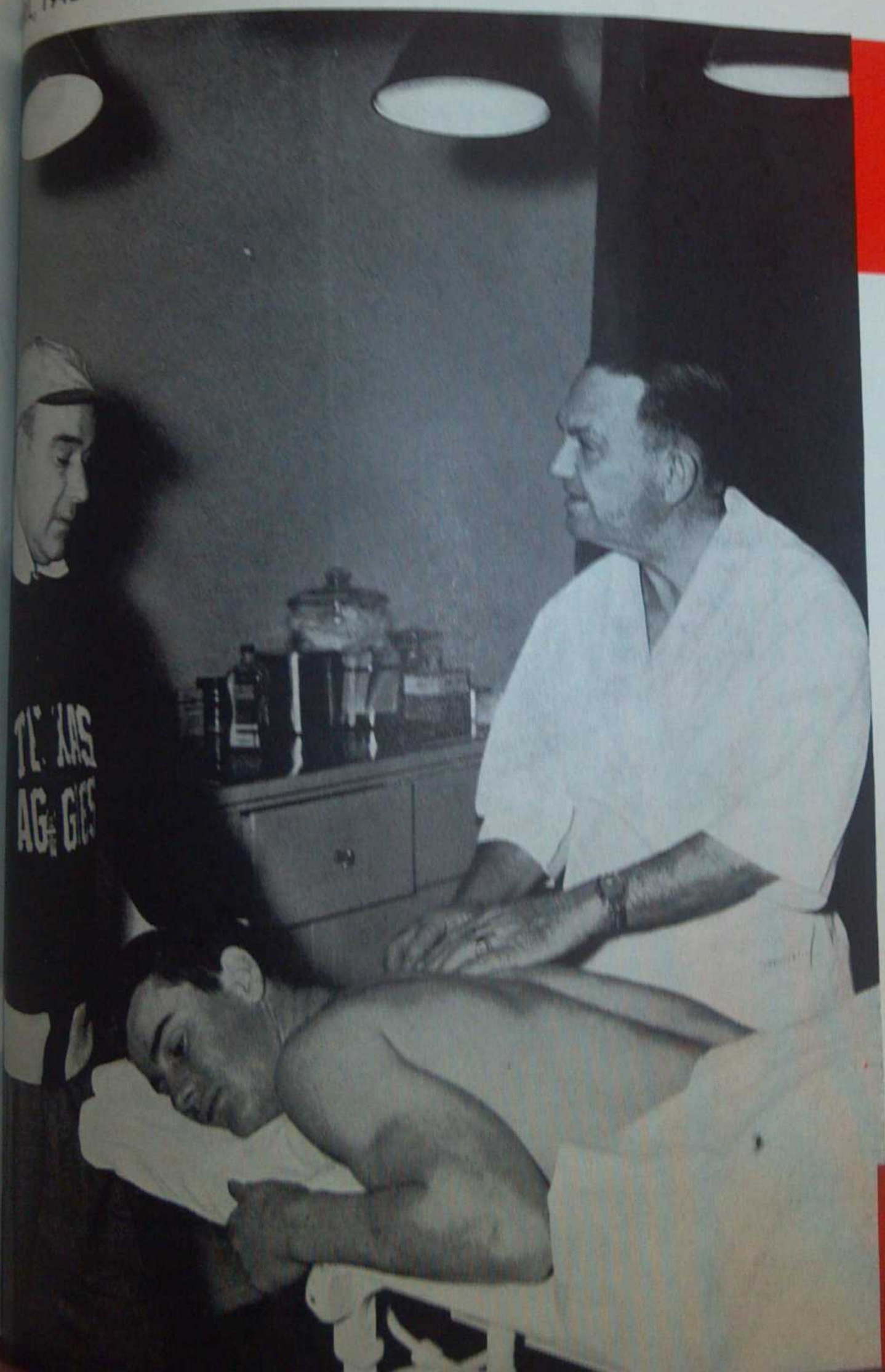
TRAINERS JOURNAL

SECTION

NATIONAL ATHLETIC TRAINERS ASSOCIATION

1942 No. 8



Official Publication
Of the National Athletic
Trainers Association

Homer H. Norton, Athletic Director and Football Coach
Lil Dimmitt, Baseball Coach and Trainer
Texas Agricultural and Mechanical College

THE
TRAINERS JOURNAL
SECTION

Official Publication National Athletic Trainers Association

April, 1942 — No. 8

The National Athletic Trainers Association Annual Meetings

THE programs are now set up for the two meetings of the National Athletic Trainers Association. The Western division will meet at ten o'clock, Friday evening and nine o'clock, Saturday morning, April 24 and 25 at Hotel Fort Des Moines, Des Moines, Iowa. The Eastern division will convene at ten o'clock, Saturday, April 25, in the University of Pennsylvania training quarters.

The election of officers for next year will be held at both division meetings. The nominations as received at this time follow. If others are received before the meetings, these will be added to the list.

President
WILBUR BOHM, Washington State College
FRANK WIECHEC, Temple University
LIL DIMMITT, Texas A & M

First Vice President
ROLAND LOGAN, United States Navy
HENRY SCHMIDT, Santa Clara

Second Vice President
TUCKER SMITH, Ohio State
HOWARD WAITE, Pittsburgh

Third Vice President
PERCY QUINLAN, University of North Carolina

Trustees
(Seven men to be elected)
ROLAND LOGAN, U. S. Navy
HENRY SCHMIDT, Santa Clara
RAY ROBERTS, University of Michigan
LON MANN, Purdue University
FRANK WIECHEC, Temple University
HOWARD WAITE, Pittsburgh
LIL DIMMITT, Texas A & M
LLOYD STEIN, U. S. Navy
EDDIE WOJECKI, Louisiana Tech
HARRY EVANS, St. Benedicts College
ROBERT SHELTON, University of Colorado
MIKE STANG, Rutgers

The High School Student Trainers Program, as sponsored by the association will be explained in detail and plans will be formulated for extending the program next year.

The meetings are open to trainers, coaches, directors and all interested in the physical fitness program of today.

—Bill Frey.

UNDER THE SHOWERS

RECENTLY appointed chairman of the Central Athletic Conference, Harry Evans has the right idea in enlisting the high schools for the student trainers' program offered by the National Association. At the big physical education meeting soon to be held in the state of Kansas, he is going to have a booth where will be found membership blanks, journals and descriptive matter of this plan for the coaches. Mr. Evans holds a class for men who are joining the armed service, helping them to get in perfect physical condition before they enter. Evans is assistant football coach, trainer and director of intramurals at St. Benedict's College, Atchison, Kansas.

AT the time of our first meeting Jack Heppinstall made himself known by his enthusiasm to do every job needed to make the association click and he has continued to give us a big hand ever since. Jack received his education in Great Britain and, as a member of the old school of training, came up the hard but the sure way. He has had great success keeping the Michigan State boys in the game. Heppinstall is one of the trustees of the association and was appointed president of the N. A. T. A. the second year of its existence.

NOW head trainer at the University of Toledo, Thomas M. Fitzgibbons has had a great deal of background in his chosen profession. He began as a student trainer at the University of Wisconsin in 1928, where he worked for the present trainer of the Golden Bears, Bill Fallen. He then took the position of recreation director in his home city, Milwaukee. In 1936 he returned to Wisconsin to become assistant to Tom Jones, track coach. After getting his master's degree in physical education, he returned to Milwaukee, this time as director of athletics and coach of all sports at the Milwaukee School of Engineering. In the fall of 1941 he became head trainer at Toledo University.

HEAD track coach and trainer at Colby College, Waterville, Maine, Norman C. Perkins was appointed chairman of the Eastern Intercollegiate Track Meet to represent the National Athletic Trainers Association. You Eastern trainers should make plans to meet with Perkins at the conference track meet this spring. I quote from his letter: "I am heartily in favor of the program which our association is sponsoring in college and high school work."

SHOWERS

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THLETIC JOURNAL

The Sore Arms of Baseball—Their Treatment

By Frank J. Wiechec
Athletic Trainer, Temple University

BASEBALL training camps are now in full swing in the South. Soon college and high school teams will be entering arms and legs and getting in shape for a successful year. A good season depends, to a great extent, on the condition of the players, and especially on the condition of their arms. Sore arms are the bane of most players, and in 90 per cent of the cases, occur at the beginning of, or during the spring training season. Without doubt a sore arm is the most serious injury in baseball. It either "lays a player up" for weeks and months or it ruins his baseball career entirely. Such famous players as "Dizzy" and Paul Dean, "Lefty" Rowe, Wes Ferrel and John Vander Meer had their careers cut short because of sore arms and every year many promising school players "throw their arms out" even before the first game has been played.

Players complain of soreness either in the elbow or shoulder joints. There is a great difference of opinion among trainers and physicians concerning these two injuries. Such eminent authorities on athletic injuries as Heald, Bilik, Thorndike and Denver disagree as to the location of these injuries and the type of involvement. Most treatment procedures advocated for both types of injury consist of moist heat, massage, and rest for varying lengths of time.

In my opinion, such general treatment procedures are unsatisfactory. All too often an athlete comes to the trainer, points to his arm and says it's sore, stiff, and can't be moved. The trainer looks at it and if he sees no cut or swelling, puts a heat lamp or diathermy on it, and lets it go at that. A little rub after thirty minutes of heat, and the treatment is over with the trainer hoping that the part is cured. Since it is agreed that the site of injury is, in most cases, the attachment of the muscle or its fascia to the bone, ordinary heat treatments and massage will have little effect on these injuries. Infra-red at best will not penetrate more than one-sixteenth of an inch and diathermy is usually not given long enough to produce any benefits. Massage, if applied properly, can be beneficial but this does not mean just a general rub over the part. An injury, no matter how trivial, deserves a careful examination, a cautious diagnosis and a well-thought-out regime of treatment. Failure to do this is one reason why injuries to the arm respond so poorly to ordinary treatment.

Shoulder Injuries (Glass Arm)

The usual complaint in shoulder injuries is of aching in the upper arm and difficulty in raising the arm above the shoulder. There is no limitation of movement, although pain is experienced when the arm is put behind the neck or across the small of the back. At night the ache, like that of a sore tooth, becomes more severe, frequently causing sleeplessness. If the patient falls asleep, he will awaken with pain if he happens to roll on to the affected side. In the so-called Glass Arm, the usual theory advanced is that the synovia of the tendon of the long head of the biceps has been irritated and thus inflamed. The author concurs with the belief of Thorndike that the teres minor and major have been involved. Careful digital examination of the shoulder during the acute stage produces excruciating pain deep in the humerus near the insertion of the teres major and minor. Examination, if continued along these muscles, will reveal tenderness along their lengths even up to their origin.

Treatment: Treatment should be the same whether the biceps or the teres muscles are affected. The back and front of the shoulder, as well as the arm, should be heated until the part is relaxed and a good hyperemia appears. For general heating effects, I find that the whirlpool bath is most effective. The entire part can be immersed at one time and increased circulation is assured throughout the area.

Since the effects from this are not penetrating, local and concentrated heat must also be provided. For local heating the spark-gap diathermy is preferred to short-wave, because the deep heat effects can be more easily concentrated over a small area. Following diathermy, a deep friction type of massage should be attempted. The painful area should be worked on, using the thumb or two fingers in an effort to break down the adhesions or nodules usually found there. This type of massage is painful and leaves the arm in a sore and tired state, but even though it is severe, the results according to my experience have been quite satisfactory.

For the first week the routine should include at least two treatments a day by the trainer; later as the part responds to treatment, once a day will suffice. The afternoon treatment should be gentle and relaxing and have as its aim the relieving of pain from the morning workout. A thirty-minute short-wave treatment with the induction coil followed by a ten-minute deep sedative massage and gentle passive movements of the joint will suffice. In the evening a hot pack or electric pad placed over the shoulder will keep it warm and relaxed until the next treatment.

Elbow Injuries (Pitcher's Elbow)

Soreness in the elbow usually follows a sudden violent wrench, or prolonged strain of the forearm. There is aching in the outer side of the elbow which is most marked in certain movements, unnoticed in others. The pain tends to get progressively worse with use until, in severe cases, a feeling of soreness is constantly present. It is painful to supinate the wrist and throwing the curve ball is the exercise that produces the pain. The pitcher's elbow or tennis elbow as it is more often called, will invariably show spasm and pain after a game, usually over the supinator longus and brevis, brachio radialis and extensor carpi radialis muscles. The region of the external condyle will show tenderness on pressure and, when the elbow is extended with the forearm fully pronated, the typical pain will be elicited along the forearm.

Treatment: The treatment of pitcher's elbow depends on whether it is recent or chronic. In a recent injury, after pain and bleeding have stopped, treatment measures should be instituted as soon as possible, in order to prevent the formation of adhesions. Again the treatment of choice is the whirlpool bath. The arm should be immersed for thirty minutes. While it is still in the bath, massage should be given underwater to the area injured. Massage will be more beneficial when the joint is in a relaxed position. The deep tissues may be reached and manipulated without causing pain or tension. After the heat treatment an analgesic pack should be wrapped around the elbow and the elbow kept warm and at rest until the next treatment.

It is the chronic elbow injury which responds so unsatisfactorily to treatment. Nearly always it is the result of neglect of adequate early treatment. Muscle spasm adhesions, contractures and poor circulation all are found in a chronic joint, and routine heat and massage hardly have any effect on the injury. Strenuous measures must be taken. These include the use of

whirlpool and diathermy, each for thirty minutes, to assure deep heat and adequate circulation. The sinusoidal current is next applied, using the Bayumi technique as outlined by Heald. This current exerts an effective pull on the adhesions by virtue of its great strength and long continuance. The treatment is then brought to a close by the application of a deep sedative massage over the arm and elbow.

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Co-ordination of the Movements of Breathing and Running

By Albert E. Lumley

Track Coach, Amherst College

A graduate of Michigan State Normal College, where he participated in track, football, boxing and baseball, Mr. Lumley served as director of intramural athletics at Oberlin College from 1925-28. Since then he has been director of intramural athletics, head coach of track, cross country and hockey at Amherst College.

THIS investigation was started during the summer of 1931 in the psychological laboratory of Oberlin College. Professor Raymond H. Stetson, then head of the psychology department, furnished the facilities of the testing laboratory and spent three months of his own time in promoting this study. Professor C. V. Hudgins of the Clark School, of Northampton, Massachusetts, and A. W. Hubbard of Reed College, Portland, Oregon, have also made many contributions during the last ten years.

Walking and Running

When a man walks, we all know that he tends to fall forward, but by placing a foot forward and the opposite arm, he catches himself and then does it again with both feet in contact with the ground. When he runs he makes the same sort of movements, but keeps only one foot in contact with the ground, evidently leaning more to the front and pushing harder off of the back leg.

Breathing While Running

When a man runs, the abdominal muscles perform two functions simultaneously; namely running and breathing. While he is running, the abdominal muscles must give postural support to the pelvic girdle, to which the leg muscles are attached. Since at the same time breathing increases both in rate and in amplitude, the abdominal muscles become also very important muscles of respiration. It is the purpose of this paper to find out how this mechanism performs these two functions.

The following muscles are used in inspiration: diaphragm, external intercostals, internal intercostals, sternocleidomastoid, scaleni, serratus posticus superior, transversalis and serratus posticus inferior.

Another combination of muscles are used in expiration: rectus abdominis, external oblique, internal oblique, transversalis, serratus posticus inferior and latissimus, and perhaps the iliocostalis and the quodratus lumborum. Hamburger would also add the internal intercostals, but this is a doubtful point.

Running-Breathing Co-ordination

We all know that many of these so-called breathing muscles take a very active part in this business of running: fixating the chest and abdomen, holding the torso more or less rigid aid elevating the legs.

If these statements are true, then when a man runs and breathes, he must develop a co-ordination of the muscles for this double duty. He is probably not aware of this co-ordination but if he is a good runner he must have a better co-ordination than a poor runner. From what I know of the breathing-running set-up I am willing to state that there is a co-ordination of breathing while running and of course we can teach it.

The Lungs

In man the lungs, the organs of external respiration; are built in the following way. The trachea, or windpipe, a wide tube about four and one-half inches long, divides into two main branches or *bronchi;* these subdivide again and again, becoming gradually smaller. The terminal ramifications, or *bronchioles*, open into rather wider parts, the *infundibula*, the walls of which are beset with a number of minute cavities, the *alveoli*. The *alveoli* are the special respiratory parts of the lungs.

We can breathe fast or slow, but we must remember that the movements of inspiration and expiration call for the use of a large number of the muscles needed in the running movements. Normal man breathes 17 or 18 times a minute but the rate is set by the needs of the organism. He may normally take in from 25 to 30 cubic inches of air but he can easily take in 125 or 130. According to Seaver the breathing capacity of the average college man is 253 cubic inches.

Training and Breathing

Training for one week will increase the load carrying ability of the lungs but the full effect is only observed after from six to seven weeks. In other words it should take us about six weeks to get the breathing apparatus of a man ready for a race.

Breathlessness

We are seldom astonished by things which we, as coaches, see every day, and it seems natural to everyone that a man should be out of breath when he has been running. But if we think about the matter there is something surprising in the phenomenon of breathlessness while running; when we run the legs do the work and the lungs become fatigued.

Perhaps you remember the old saying, "A horse trots with his legs and gallops with his lungs." This is a true saying and can be accounted for by the fact that in trotting the horse rapidly uses a few large muscles which produce local fatigue, while during the galloping action many muscles all over the body are used, thus producing breathlessness before muscular fatigue. Men do not trot in races, they tend to gallop.

It may be stated that breathlessness is a feeling or distress which is produced during violent exercise or intense muscular work, and it is characterized by an exaggeration of the respiratory need, and by profound disturbance in the functions of the respiratory organs. This state is merely a peculiar form of dyspnoea and presents the general phenomena due to deficient aeration of the blood. We also discovered that during breathlessness it is not hard for a runner to inhale air, but that the exhaling of air is a very difficult matter. Personally I think this ties up with the fact that the rectus abdominis and the oblique muscles are busy with the running mechanism.

Muscular Training

Muscular training, especially exercises of endurance, improves the quality of the

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and lungs to take care of the in-
demand. If the amount of mus-
work be increased beyond the rate
mination, acute general fatigue or
lessness is inevitable, even if the
e in the best possible condition.

Muscle Soreness

us consider a statement made by
in the second century. "If anyone
diately after undressing proceeds to
more violent movements before he has
ed the whole body and thinned the
ions and opened the pores, he in-
the danger of breaking or spraining
of the solid parts, but if beforehand
gradually warm and soften the solids
thin the fluids and expand the pores,
person exercising will run no danger
aking any part."
e can now state that there is an-
e cause of muscle soreness and that
e presence of irritating waste matter
fectly carried off by the blood stream
the lungs.

Muscular Fatigue

olute muscular fatigue cannot be ob-
outside of a laboratory but all of
ave seen athletes suffering a painful
tion just before muscular fatigue sets
The athlete shortly loses the power
ontrol a fatigued muscle. We can
e that the phenomenon of fatigue is
ed to four orders or causes:
. Material lesions of the motor or-
s; 2. Auto intoxication by the waste-
ucts of work; 3. Exaggerated use of
living tissue; 4. Dynamic exhaustion
e motor elements.

The Heart

During all of these tests we kept an ac-
ate record of the heart action by the
of a Wiersma hand plethysmograph.
can state that a trained man can per-
a given amount of work with a
er consumption of oxygen than an
ained man; and that he, therefore,
es a smaller demand on his heart. The
al pulse rate ranges from 50 to 90
ats per minute but after running we
find that it has increased to 180 or
e beats per minute. Trained athletes
a more regular heart beat than un-
ed men.
The heart rate of trained men is usually
to eight beats lower than in the same
n out of condition.
In long distance races the oxygenation
the blood and the demands of exertion
pace. The breathing becomes abdom-
The peripheral arteries fill and the
beats more fully. In this condition
might say that fatigue is not due so
en to oxygen hunger as to gradual fa-

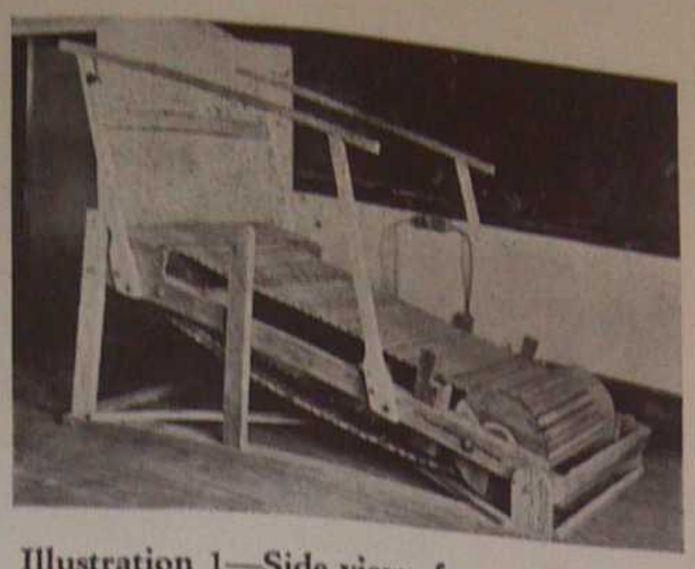

Illustration 1—Side view of treadmill used in this experiment.

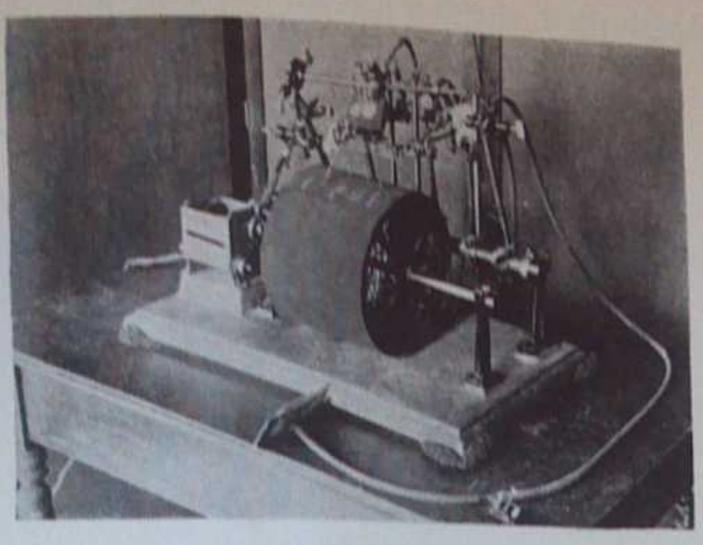

Illustration 2—View of kymograph and recording apparatus.

Illustration 3 shows the bound hand containing the Wiersma hand plethysmograph used to record heart rate.

tigue of the cardiac muscle.

Heart tests made during the last ten years seem to show that one of the practical things that we can do as track coaches is to take the pulse rate of every boy in our school or college. Those with low pulse rates of 54 or less standing should make good distance runners. (One good example, MacMitchell of N.Y.U., with 38 beats per minute.)

Second Wind

The initial dyspnoea produced by strenuous exercise is accompanied by a disturbance of the normal acid-base balance of the blood and tissues. The relief of second wind is probably the result of the adjustment toward a new equilibrium of the various mechanisms engaged in the supply of the much needed oxygen to the active tissues. These adjustments involve primarily the circulatory and respiratory systems, but adjustments must also be made in the muscular and heat-regulating mechanisms.

When the exercise is very strenuous, the new equilibrium may be such that each of these systems is functioning at its maximum capacity. Under these conditions, oxygen is being supplied to the tissues and carbon dioxide being removed from them at about the maximum possible rate, while the lactic-acid content of the tissues is held at a relatively low level. The alveolar carbon dioxide falls below that present during dyspnoea, the tissues become less acid, pulmonary ventilation is decreased, the pulse rate is diminished, and perspiration begins, thus effecting a greater heat loss from the body and the bodily efficiency rises.

The initial dyspnoea may be diminished through training.

Second wind is common among experienced runners but almost unknown to the average citizen. Some professional track coaches say that second wind does not exist. They are partly right, because some runners never experience its benefits. It is, however, safe to say that the phenomenon known as second wind, by which the runner experiences a sudden relief from the agony of breathlessness, is a readjustment of elimination to the increased production of waste.

Field Observations

After studying the black sheet records made while the subjects were running on the treadmill, we definitely found a breathing-running co-ordination of one breath to two pairs of steps. With this in mind, we decided to make field observations on our subjects while they were running on an outdoor track. We used an open car and rode directly at the side of the runner. One of us counted left foot steps, another breaths by listening to the inhalations and exhalations. (Notice we did not count the rise and fall of the rib cage because it does not make any obvious movements.) Another man acted as recorder and a fourth as driver. These observations proved to me that good runners breathe at the rate of one breath to every two pairs of steps as long as they possibly can. Poor runners seem to have a hit-and-miss system of breathing and running, or no system at all.

I am convinced that almost all of our good runners have a co-ordination of breathing and running. If this is a true statement it seems to me that we should interest some one like our own war department in conducting tests on soldiers. If we could prove in thousands of cases that men can be taught to breathe efficiently while running, walking, or marching, we certainly would make a contribu-

tion to the efficiency of our army as well as to that of our athletic teams. Swimming coaches seem to be a few jumps ahead of us in this matter of breathing, but I think that they have missed some of the very important possibilities of co-ordinated breathing.

Discussion of Results

From the above results one can see that the running mechanism is very complex. It involves not only the legs, the action of which is centered about the hip-joint, but the entire group of abdominal muscles. Since the abdominal muscles are so important for running, this experiment demonstrates that the running co-ordination modifies breathing; and since breathing is so important to running, the experiment shows that the runner must in some way make the two conflicting co-ordinations work together. We believe, then, that the ability to make this co-ordination is what distinguishes a good from a poor runner. Strength of leg muscles is important for the runner; but it seems to us that the most important thing is the working together of the breathing-running co-ordination. This is especially true for the distance runners. With sprinters this breathing-running co-ordination is not a primary issue. A man will probably breathe once or twice in a hundred-yard dash; but our records show that in running longer distances, he will breathe approximately at the conclusion of every two pairs of steps and, as he becomes fatigued, at the conclusion of every pair of steps. In a distance race this eventually calls for a breath at the conclusion of approximately every twelve feet covered.

A possible clue to the immediate cause of a stitch in the side lies in the fact that there is not a co-ordination between the breathing-running mechanism and the two are in conflict. Perhaps one of the chief factors in so-called second wind lies in the fact that the runner has resolved this conflict and that there is now a co-ordination between the breathing-running mechanism. It is hoped that further work on this problem will explain second wind, but the data gathered so far seem to indicate that the conclusions as suggested are sound. Some men have a very definite feeling of second wind, but others have no such experience, although they are good runners. It is doubtful as to whether a well-trained man would have this experience because a very vital part of his training, whether he knows it or not, consists of his bringing in line the two conflicting mechanisms and he probably often starts out a race with second wind.

There are many causes of breathlessness, but we have come to the conclusion that one of the important reasons for this phenomenon is the non-co-ordination of breathing and running that is common to so many athletes.

We can state that fatigue while running can be definitely postponed by the use of an habitual breathing-running co-ordination.

We have studied the heart action while the subject is reclining, sitting, and standing, as he begins to run, and during breathlessness, fatigue, and recovery. We can state from this experiment that the heart is noticeably affected by each of these conditions, and that a breathing-running co-ordination allows the heart to make regular movements that will help retard fatigue and breathlessness.

Summary

1. The records show that running modifies the breathing mechanism and that the fixation of the abdominal muscles in the performance of their function of postural support of the pelvic girdle for the running mechanism tends to fixate the chest and thus interfere with its expansion.

2. Evidence is presented which indicates that the runner may work into a convenient co-ordination of these two conflicting mechanisms and it is suggested that this fact may be a clue to second wind,' and that the stitch in the side may be due to the inability of these two mechanisms to work in unison.

3. Records of the heart rate show distinct differences between trained and untrained men. They also show that the heart rate is definitely affected by the breathing-running co-ordination or by lack of it. Further work on this problem is proposed.

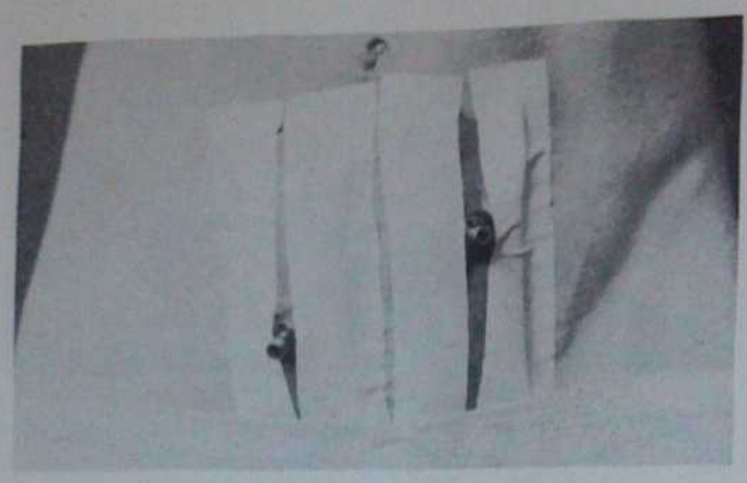

Illustration 4 — Pads taped on the two columns of the rectus muscles, used to record the movements of the lower segments of the rectus abdominis.

Program of National Athletic Trainers Association Meeting Eastern Division

1. Informal meeting of trainers in the University of Pennsylvania training quarters on Saturday, April 25th, at 10 A. M. The purpose of this meeting is to become acquainted with other trainers in the East and make plans for future meetings.

2. Educational meeting for trainers, coaches and others interested in athletics. This meeting is to be held at the University of Pennsylvania on Saturday, April 25th, at 11 A. M.

3. Round table discussions of the following subjects:

   a. Athletic trainers and their contribution to our present war effort. A discussion of the branches of service for which trainers are best suited.
   b. Track injuries—their protection through adhesive strapping.
   c. Knee, ankle and shoulder injuries—their treatment and prevention.
   d. Program for high school trainers.
   e. The advantages of membership in the National Athletic Trainers Association.
   f. Colds on the squad—their treatment.

4. Election of officers in Eastern section of Trainers Association. Chairman, Frank Wiechec, Temple University.

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Knee Injuries

By George Brent Fielding
University of New Hampshire

High School Trainers Lesson No. 8

AMONG the many educational features emphasized by the National Athletic Trainers Association is the dissemination of knowledge relating to training problems among the high school coaches by athletic trainers of the colleges and universities. The many high school coaches who have to serve both as instructors of coaching techniques and as trainers of their squads have welcomed this information. The University of New Hampshire has done an excellent job in giving to the high school coaches of that state a series of informative articles on the various phases of athletic training. In the March issue Lil Dimmitt of Texas A & M wrote of that institution's close co-operation with the coaches of that state in furnishing information on training questions by telegrams when immediate replies are needed.

Mr. Fielding, author of this article, is freshman football coach and varsity tennis coach at the University of New Hampshire.

IN my opinion, knee injuries are the most dangerous in football. The time lost from game play and the classes, due to this injury, by far exceeds any other in athletics.

In this injury, like many others, many of them might have been prevented. This is one of our first considerations. It then becomes the duty of the coach, as I see it, to devote a good portion of the pre-season conditioning period to specific exercises which will strengthen the knees. This is especially true of the linemen who are apt to get knee injuries, due to mousetraps and clips in the line. Each coach should make himself familiar with the anatomical structure of the knee joint so that he may deal more effectively with the problem of knee injuries.*

As a measure of prevention I have listed some simple exercises in the paragraphs to follow that have given me some good results. These exercises are both preventative and corrective in nature, they may be used for both.

1. Place the hands on the hips and flex the knees. In a squat position, walk to the side and the front imitating the duck walk.

2. Flex the knees and place the hands on the ground inside the knees. *Movement:* Jump to stride standing and fling the hands to the side. Repeat ten to fifteen times.

3. Flex the knees and place the hands on the ground outside the knees near the toes. *Movement:* Extend the leg to a horizontal position; hold for five seconds and return; repeat with right and left legs ten to fifteen times.

4. Lie flat on the back, legs straight. *Movement:* Move the right leg and rotate it in small circles inward, repeat with the left leg ten to fifteen times.

5. Lie flat on the stomach; legs straight. *Movement:* Move the legs up and down using the chest as a rocker in much the same motion as the flutter-kick in the pool, three minutes.

6. Lie flat on the back. *Movement:* Raise the right leg to a perpendicular posi-

*Anatomical structure of the knee joint was discussed by Frank D. Dickson, M.D. in the October and November issues of the Trainers Journal.

tion and bring it over the body until it touches the ground. Keep both shoulders flat on the ground. Repeat with the left leg. Repeat ten to fifteen times with each leg.

7. Stand in an upright position. *Movement:* Without bending the knees touch the hands to the ground. Repeat ten to fifteen times.

8. Lie flat on the back. *Movement:* Raise the legs to a perpendicular position over the body, grasp the toes and rock back and forward, three minutes.

9. Assume an upright position. *Movement:* Place the right foot on the edge of the training table, grasp the right knee with the hands and arms; push up with both legs extending a downward pressure on the right leg.

10. Place both feet against a stationary object. *Movement:* Use an imaginary rowing stroke, bending both knees and bringing the arms down over the toes.

Having discussed briefly the types of exercises we might use to prevent knee injuries, we can begin a discussion of the knee and the factors that cause injury.

In dealing with joint injuries, we must remember that we are dealing not only with the joint but the structures surrounding it as well. Injuries to these parts, while painful and perhaps resulting in disability, have little chance of resulting in permanent injury. Our chief consideration is with these parts, which go to make up the joint and which are most frequently left in a damaged and unstable condition following a recovery.

The parts most often damaged, which are most likely to cause disability are: 1. The lateral ligaments (internal and external) and 2. The semilunar cartilages (internal and external).

Injuries to the lateral ligaments: The lateral ligaments are two in number (internal and external) and are located without the joint at a point near the center of the internal and external sides of the knee. They are anchored to the tibia (shin bone) and the femur (thigh bone).

The external lateral ligament is seldom sprained and unless the injury is very severe, it does not cause any great degree of trouble.

The internal lateral ligament, on the other hand, is very often sprained and twisted. The injury usually happens as the knee is forced inward, while the lower part of the leg is either fixed or forced outward. This type of movement forces the internal side of the joint to expand beyond its optimum range. This results in a strain or a rupture of the ligament.

The following symptoms are evident in a diagnosis: 1. There is pain on the inner side of the knee. 2. Pain is caused by forcing the knee inward and the foot outward. 3. There is tenderness on pressure confined to the line of ligaments. 4. The knee did not lock, this suggests a ligament injury.

Injuries to the Semilunar Cartilages: The semilunar cartilages, two in number—internal and external—are located within the knee joint. Due to their shape and attachments, the internal cartilages are more frequently injured than the external.

The mechanism of the injury to the internal semilunar cartilage is nearly always the same. The ankle bends inward, the force bends the leg inward while the inner side of the point is open, the upper part of the leg is twisted upon the lower part, causing a grinding movement of the joint. This usually forces the internal lateral ligament to give away. As the inner point of the knee joint opens, the semilunar cartilage, which is strongly attached to the ligament, is pulled out of its socket. When the pressure is released on the knee, the joint snaps shut and pinches the cartilage. Sometimes it is just bruised and it slips back in its proper position. In the typical case the cartilage is split or broken or the end is nipped or folded over, so that some part of it does not get back into its proper place.

The symptoms which follow are evident in a diagnosis: 1. The knee usually locks or has been locked. 2. Tenderness over the injured lateral ligament. 3. Tenderness over the upper edge of the tibia. 4. Pain and tenderness on the posterior side of the knee.

Having briefly outlined what happens in a joint injury, we are ready to begin a discussion as to how we may treat an injury to the knee joint.

Our first consideration is to make sure that there is no fracture. We always insist on an X-ray. After we have made a preliminary examination, the following procedure is recommended. We wrap the leg in cotton and bandage with gauze. We then begin to apply ice cold water to the knee and continue this treatment until the skin under the gauze becomes white and wrinkled. At this stage the cold has served its purpose, that is, the checking of effusion into the joint.

The wet coverings are removed. A light coat of analgesic balm is put over the knee joint, and covered with cotton, then wrapped with an elastic bandage. This is done to insure heat in the joint and to keep it from getting stiff.

The athlete must be kept off the leg. After a twenty-four hour period we begin to use the whirlpool bath for twenty minutes a day. Then we give the knee a light massage, and apply an analgesic pack. We continue this treatment for five days. By this time the athlete should be able to walk. We continue heat treatment twenty minutes in length. To bear weight on the leg it is necessary for us to strap the knee.

If the athlete returns to competition it is necessary to strap the knee and have the boy wear a protective brace. I recommend the use of the Duke Simpson brace and I insist that the boy wear the brace at all times.

What the Schools Are Doing

(Continued from page 9)

can walk the miles, crawl the hills, tote the gun. It is the function of another class to teach him to shoot when he gets there.

Competitive Exercises; Modified Games

1. Steeplechase: A steeplechase course of about 1100 yards was laid out. It involves running in narrow rocky lanes, down a steep forty-five degree slope, up a shale cliff, over slick grass and a dump, across a creek. The finish is a one hundred yard-straightaway up a long grade. This course is used, for the most part, to alternate with the barricade course. They are both rarely used on the same day. Time is taken on this course about every week. This time serves as a rough indication of stamina.

2. Relays: One day a week, usually the last class day, the work is entirely devoted after the calisthenics to competitive work. Competition over the barricades, individually and in squads; competition over the steeplechase individually and in squads. The usual shuttle relays are much used. The course of the relay is usually set so that there are one or more turns involved for each man. Relay in which every man runs fifty yards in two twenty-five-yard laps. Same relay in five-yard laps. Relays in which the men run the laps backward, on the hands and feet, hop, etc. The usual relay is modified by using a heavy medicine ball as baton.

The most popular and effective relays are those involving obstacles of some sort. Human obstacles are the most flexible so they are used the most.

a. Two squads form obstacles while two squads compete. Variation of the old game called Bombay is used. Three or more stands of three men each are made on a fifty-yard course. Squads compete

THIS is the first program arranged especially as a war-time conditioning course, that we have been privileged to print. Other institutions may have worked out special courses. We shall be glad to have them written up for publication.—Editor's note.

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ing a flip over each stand on the
over the course and run back to the
straightaway. Stands are made by
two men, buttocks to buttocks,
man places head between the out-
ges of the men, the right of one and
ld of the other. He locks the stand
The runner catches this locking man
ecking one leg of each man with an
p as a mat and balance at the same
This is a very simple and safe way
ning to hit and roll. Incorporated
relay, it makes for quick adjust-
and good control.
Same relay as above but one more
placed some four to six feet from
nal. He is bent in leapfrog stance.
kes the runner use a quick two
l take-off for his flip, decreases his
nal speed, and increases his control.
r variations of these ideas are easily
ed out, the variety depending upon
mber of men available to make the
s and the imagination of the in-
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s: Games, as such, are not used
much as they are usually based upon
ea that a game should be played
een fairly equal forces. It has been
ttempt to modify the games so that
ne could operate under adverse con-
s conditions where the odds are
ed against them, conditions that call
ingenuity and will power. This sort
me playing has brought forth the
de on the part of the men that any
f them would take on the whole class
mebody thought that up.
tball, basketball and the like do not
themselves to that sort of manipula-
for two reasons. Tradition is prob-
the strongest, and the fact that the
men would make it no contest.
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devise most of the games, for ex-
: Battle of Singapore or Java or
One squad is placed on a mat. The
must keep their hands and knees on
t. Two squads are set to root them
with the same conditions prevailing,
ands, no standing. The third squad
ld in reserve so that, if and when,
defenders of the mat make a good
, they are thrown in against the
defenders. This is rather rough, but
conditions are adhered to, it is effec-
and furnishes exercise.
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es and footholds.
variations of what we call unfair
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ence and call up the ability to work
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ual pairings of men are broken up
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to be alongside at the time.
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APRIL, 1942

detail so that if any of them appear valuable, the means for their execution are readily available. The course as described is by no means crystallized. We are learning new things every day, gathering and sifting additional material, checking and re-checking progress. On the whole, we feel that we are on the right track, that we will be able to get the men not only in good, but excellent condition by the time they go into the service.

Medical Examinations for Boys of the 1942 Graduating Class in West Virginia High Schools

By Alden W. Thompson

Dean, School of Physical Education and Athletics, West Virginia University

CURRENT reports indicate that the physical examination of selectees by army doctors is eliminating from military service almost 50 per cent of those who would otherwise be available. In World War I the figure was about 33 per cent and its disclosure resulted in a wave of state compulsory physical training laws the country over. Unfortunately, however, medical examinations to go with the physical activities were not required generally and money was not made available to provide necessary examinations and to make certain that the defects discovered were corrected. While present examinations are more stringent than in 1917 and also include a blood test, the high rate of rejection calls for action that will reduce it wherever possible.

Today, with man power and more man power needed to operate the mechanical weapons of war, we find among the leading causes of rejection from service *poor eyesight*, *poor hearing*, and *bad teeth*. All three are correctible to a considerable extent over a period of time. Rejection for general lack of physical capacity and strength is far down the list.

Even with increased attention to health and physical education in our schools during the past twenty years, the fact remains that funds have not been provided for periodic medical examination and the machinery necessary for corrections. Consequently we find ourselves almost as unprepared today as twenty-five years ago. In addition, industry now demands workers with the ability to pass a physical examination and we are in the all-out type of war in which civilians themselves undergo tremendous physical and mental hardship.

The need is obvious and great among both our school and general population for:

(1) Immediate knowledge of the exact physical condition of those who may be called soon to military service.

(2) The correction wherever possible of discovered defects *before* army examinations and consequent rejection.

(3) Similar activity among prospective industrial workers.

(4) Increased recognition by the general population of the need for a high level of physical condition and stamina.

In our 267 high schools of West Virginia there will be graduated this year approximately 17,000 seniors. About half of them are young men ranging from seventeen to twenty years of age, with the average eighteen plus. Many of them will volunteer for military service by next September. All will be called by the Selective Service Act in the next two years. Industry will need many.

Discussion with school and medical personnel indicates that less than 5 per cent of these young men have had an adequate medical examination, comparable to that of the army, during their high school course. Athletes are checked over more than the general student body, but the passing of a medical examination is not mandatory for participation throughout the state. Many pupils are given a health examination before entering the first grade, but not all. Practice varies greatly after that. County health units do not exist in all counties and doctors and nurses must necessarily concentrate on immunizations and control of epidemics. Classroom and physical education teachers can assist and do cursory inspections but medical personnel is necessary for adequate examination. Knowledge of condition through examination means little without follow-up for correction, but correction will never occur without that knowledge of condition. West Virginia schools this year are serving total grade groups approximately as follows:

Elementary (1 to 6) 306,000 (including some seventh and eighth grade units); Junior high (7-8-9) 32,000 (inclusive of enrollment of six-year organizations); Senior high (10-11-12) 110,000 (including six-year organizations).

All evidence points to an average of not more than one *adequate medical* examination per pupil in the twelve years of common school work, with follow-ups varying greatly in effectiveness, and generally inadequate.

It is suggested that county superintendents and principals of senior high schools in West Virginia will be doing a patriotic service if they can arrange in some way to give every senior boy a graduating gift of a complete medical examination and then help him to have corrected such defects as may be discovered.

Basically the health needs of girls are just as great, but imminent military service undoubtedly gives the priority to boys, if the examination program is not available to all. Most of these boys will have one or two years before actual military call. In that period corrections may be made and general physical condition toned up to war-time efficiency. The diploma testifies to mental ability and the completion of a knowledge program. A physician's certificate of physical condition would be a possession of great value in the face of the rigors of war service and would be a guide by which further personal physical progress could be planned.

The cost of medical examinations varies greatly throughout the state. In some communities individual physicians reduce their rates or even donate their services. In others, service clubs such as Rotary, Kiwanis, Lions furnish funds for examinations or corrections, or both. County health units are giving great service in the face of large jobs and small staffs. Man power today, however, is a national asset and should be conserved at national or state expense, not left to chance or even individual initiative. Luther Poling, Director of Health Education for the N. Y. A. in West Virginia, reports that medical (including dental) examinations have been given to 6,000 out-of-school youth of high school age during the past eight months, 75 per cent of whom were high school graduates. The cost of these examinations, either by clinics or by individual physicians and dentists by appointment, averages less than $2.50 each. On this basis, if similar costs could be worked out locally the total would be extremely reasonable in light of the national emergency. Approximately 8,500 boys from fifty-five counties will graduate in May or June of this year. If their examinations and consequent corrections reduced the rejections to one-half or one-third the usual rate, the difference might be the difference between victory and defeat, between life and death for some, between freedom and slavery for future generations. The value to our national defense effort could not be estimated.

It is suggested that each of the fifty-five county superintendents in the state discuss this matter with their boards of education and high school principals and seek (1) to provide a complete medical examination for each graduating senior boy by May 1, and (2) to counsel with him about getting started at once on a program of correction of whatever defects are discovered.

Many calls are being made upon you for your energy and time. All seek to build up the striking power of the United States in its fight for the right to live in a state of freedom and personal opportunity. Nothing is more important in that fight than man power. The man power of the America of tomorrow is in your schools today. Protect it and build it up to its highest efficiency.