CHAPTER V

Safety Methods and Devices

Safety in any sport depends upon wise administration, which takes the following control factors into account in setting up an environment conducive to best results.

Efficient Use of Physical Plant

Factors to be taken into consideration in achieving efficient use of the physical plant are the following: effective use of facilities and equipment; proper time allotment; proper selection and training of personnel; a well-designed gymnasium with adequate lighting and ventilation; regular maintenance, including daily inspection of equipment; proper financial support.

Effective Organization and Supervision

Factors to be taken into consideration in achieving effective organization and supervision are the following: sufficient staff to handle the student load efficiently and safely; development of student leadership to aid in controlling the environment safely; provision for watchful supervision and proper guarding of the gymnasium at all times; removal of all hazards when program is not in operation; rigid enforcement of safety rules:

A "Gymnasium Guard" should be used during free periods.
All hazards should be eliminated.
Lock the gymnasium.
Lock trampolines and springboards.
Suspend rings and climbing ropes by pulleys.

Progressive Conditioning

Factors to be taken into consideration in regard to progressive conditioning are the following: physical fitness (organic vigor) equal to the task required; the development of adequate strength, endurance, power, agility, balance and flexibility; the judicious use of warm ups; an appreciation of the importance of sound physical condition for participation in gymnastic activities.

Effective Instruction

Safety Development Desired. 1. Knowledge of the condition (namely: the strength, ability and aptitude) of the individual and of the group as well as safety procedures.
2. Good habits especially in regard to the overlearning of fundamentals.

3. Skills equal to the task.
4. Worthwhile attitudes, especially self-confidence in the performer.
5. Appreciation of the importance of a well-prepared, conditioned readiness (namely: essential strength, ability and condition) for the task at hand.

Safety Fundamentals for the Instructor

1. Remember that accidents in gymnastics and tumbling never "just happen"—they are caused.
2. Enforce the safety fundamentals as listed for learners.
3. Strict adherence to safety rules.
4. Stress need of individual responsibility toward safety.
5. Daily inspection of apparatus:
   a. Inspect for faults.
   b. Inspect for proper adjustment.
   c. Inspect for obstruction hazards, e.g., people, loose balls.
6. Stress point that a stunt executed by the skilled performer is not easy.
   a. Progression from the simple to the complex must be recognized.
   b. A performer should not try a stunt until he is prepared for it.
   c. Build strength and skill progressively.
   d. Practice fundamentals until mastered.
7. Strive to develop self-confidence of the performer.

Principles for the Learner

1. An appreciation of the value of progressive conditioning, strength, skill, coordination, and ability in gymnastics and tumbling.
   a. Warm-up properly.
   b. Do not attempt a stunt beyond ability.
   c. Master the fundamentals.
2. The value and necessity of relatively simple, though strength-building activities for the grasps and the triceps (do not swing on the parallel bars until arms are sufficiently strong) and the abdominals.
3. The need to assist each other:
   a. Master the art of spotting by acting as performer and spotter respectively.
   b. Support classmate in order that he may experience kinesthetic feel of a new stunt and being supported in turn.
   c. Assist in manipulating safety belt.*
4. A thorough knowledge of apparatus:
   a. Be able to recognize faulty apparatus.
   b. Be able to set up apparatus properly.
   c. Inspect apparatus each time it is used.
5. Knowledge of proper placing of mats:
   a. Provide adequate mats around apparatus.
   b. Place mats on apparatus when helpful, e.g., across parallel bars when learning hand balance. (See plate 5)

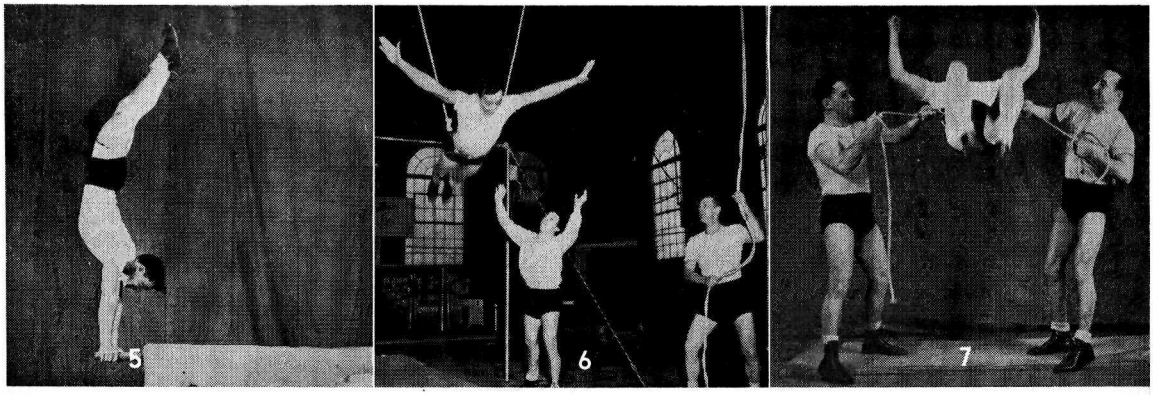
* Many instructors do not use safety belts on the assumption that the performer learns to depend upon them too much. If the individual masters lead-up activities to a difficult stunt he will not need a safety belt. In this way the performer learns to depend upon himself and great confidence is developed. Such a policy demands expert coaching.

c. Replace mats to correct position if displaced by force of dismount.
d. Tie mats together for fast continuous tumbling.

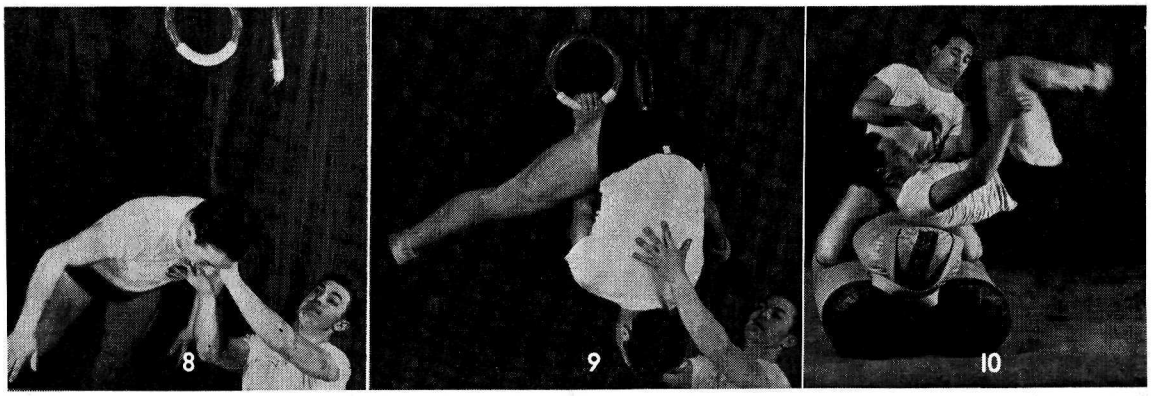
6. Ability to dismount properly from high bar and rings.
   a. Dismount on back end of swing when in extended position.
7. Ability to fall properly.*
8. Wise use of magnesium carbonate (mag.) and resin.
9. "No "horse play."

THE ART OF SPOTTING OR GUARDING THE PERFORMER

Hints for Instructor

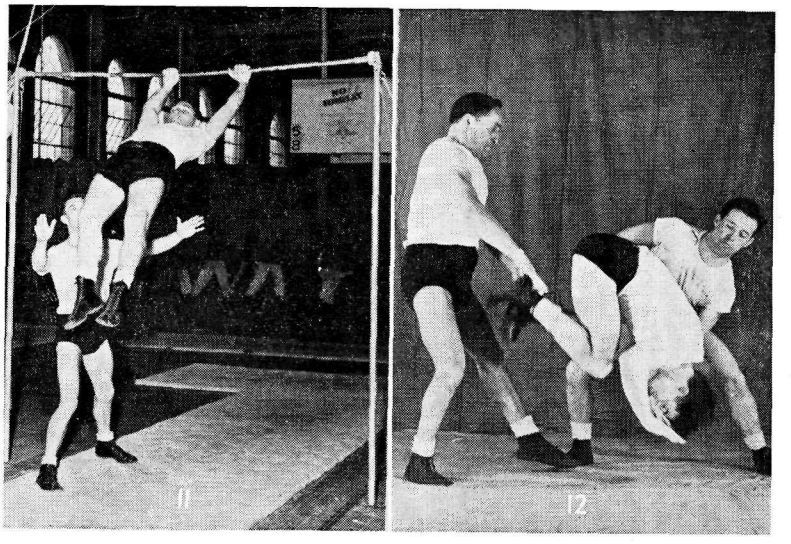


5—The placing of mats across the apparatus to prevent injury.
6—Using the suspended safety belt.
7—Using the hand safety belt.



8—Pushing the performer.
9—Holding the performer.
10—Lifting the performer.

* See Illustrations Nos. 9-33.



11—Taking a position of readiness to assist. Do not actually assist unless the need arises!

12—Teach and demand that performers spot each other effectively.

Spotting and Guarding Cues for the Performer

1. Be sure to have a spotter for a new trick!
2. Do not depend entirely upon mat protection!
3. Analyze the mechanical details of the stunt and have a spotter wherever a fall might occur!
4. Do not be foolhardy!
5. Do not jest with the performer until he has dismounted!
6. Never change your mind in the middle of a stunt!

TUMBLING AND STUMBLING

Importance of Learning to Fall Safely (Breakfall)

Tumbling, perhaps, does teach literally how to "tumble" or fall without sustaining injury The crew on board ship in a rough sea or on combat duty, the paratrooper who must attempt to alight safely, should know how to "break" a fall.

The teaching of headsprings, necksprings, handsprings, round-offs, back handsprings, cartwheels, somersaults, and other highly specialized skills should be supplemented with practical instruction in the art of tumbling or stumbling without injury. Athletes in specialized sports may prevent serious injury through mastery of tumbling or "breakfalling."

The Breakfall Is Important

From the safety point of view, the breakfall, a simple but necessary part of training, is the most important single skill in athletics; yet, it is one of the most neglected areas of directed learnings. The viewpoint seems to have been taken that the art of falling will take care of itself. Falling is a part of all types of sports as well as everyday activity and, therefore, should be regarded as a necessary fundamental in the training of every individual. Practically every sport is hazardous; certainly gymnastics may be considered so if it is not properly taught.

Principles of Breakfalling

Several principles should be remembered while practicing the art of breakfalling:

1. Give with the fall in a kind of controlled relaxation.

> "It is . . . a well-known fact that a blow of a given strength on a muscle will result in a rupture of the muscle if it is under tension, but will result in a fracture of the bone if the muscle is relaxed, and since fractures are, in general, more serious than ruptured muscles, it can be seen that there is greater incidence of fractures when muscles are in a relaxed condition. Muscles under tension, therefore, act as a protection or splint for the bone, and by taking the injury themselves prevent more serious bone accidents."[1]

2. The use of arms or legs to reduce the momentum of the fall.
3. Cushioning the fall.
4. Making use of "rolling."
5. Falling forward, if possible, by turning head and shoulders.
6. Keeping fingers pointed forward and chin on the chest when falling backward.
7. Keeping chin to the side when falling forward. It is suggested that the cadet:
   a. Practice falling with each principle in mind until mastery of all has been obtained.
   b. Devote ten minutes every day to breakfalling as a part of a warm up, and overlearn it until it becomes automatic.

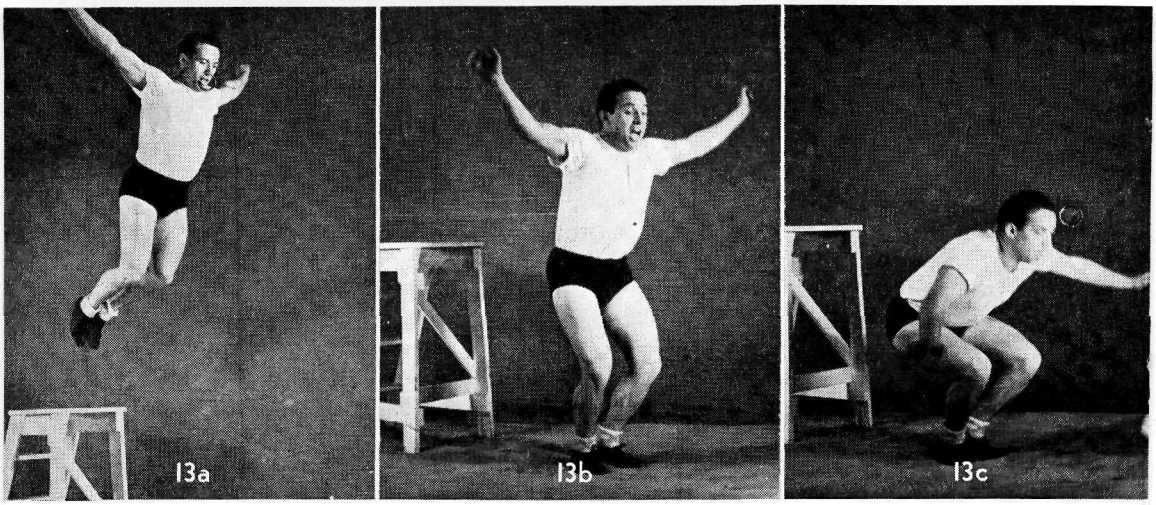
Types of Breakfalls

Everybody, civilians and members of the armed forces alike, should know how to prevent injury when jumping, or landing feet first from a height; when falling forward from four different positions, namely:

1. Head first.
2. Parallel to deck in an extended position.
3. Feet first with forward momentum.
4. Hands and feet together.

when falling sideward, and when falling backward.

[1] From *Control of Football Injuries* by Marvin A. Stevens and W. W. Phelps, Copyright 1933, by A. S. Barnes and Company, Inc., P. 15.



13—*Jumping or Landing Feet First from a Height.*—(*a*)—Keep the head up—Keep the back straight, lean slightly forward—Keep the arms extended sideways, palms up—Use the arms for balance; (*b*)—Land on the balls of the feet; (*c*)—Bend at the knees to cushion the shock of landing!

Variation.—The breakfall may be varied by executing one-half turns in the air, and by jumping off the trestle backwards, followed by backward rolls.

Falling forward head first with hips high permits the execution of a tuck and forward roll only if the hips are high enough.

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14.—*Falling Forward, Head First with Hips High.*—(*a*) Keep the tongue in—Keep eyes open; (*b*) Trail with the feet—Land with the arms straight; (*c*) Bend at the elbow—Tuck the chin on the chest and lower the nape of the neck to the deck—Give with the fall!

If falling headfirst with legs directly overhead, the *head must be forced upward* to avoid breaking the neck.

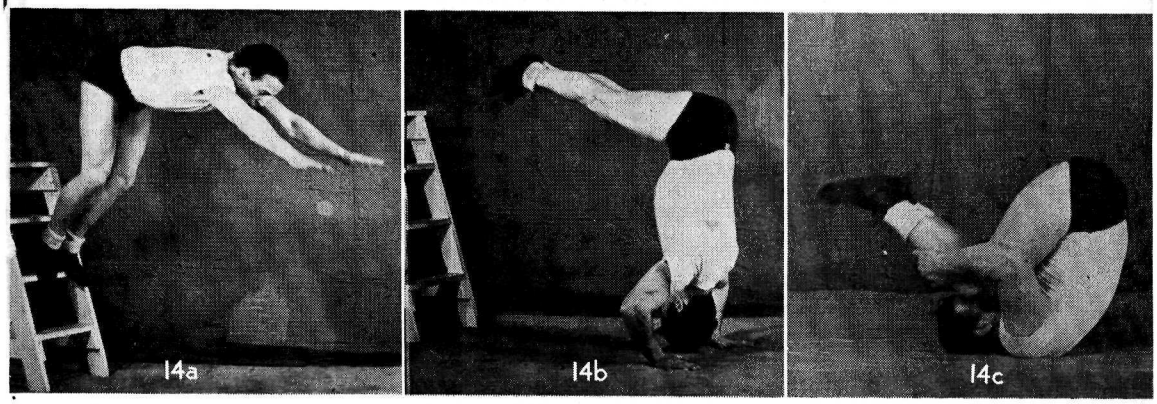
If the individual trips while running at full speed, he must resort to the slapping principle of falling often called the "Football Fall."

15—*Falling Forward, Parallel to the Deck in an Extended Position.*—(*a*) Keep tongue in—First bring forearms down vigorously—Cushion the rest of the body to the deck; (*b*) Turn the head to one side to protect the chin—Cushion the rest of the body to the deck!

A well-trained performer may catch himself on his hands, bend the arms at the elbows, and lower himself in an arched position. The chest first will make the contact with the deck followed by the abdominal region and then by the entire front of the body. By forcing the shoulders forward, the back should be arched, the toes pointed.

16—*Variation—Falling Forward in an Extended Position.*—(*a*) Keep the arms straight and land on them first; (*b*) Then bend at the elbows; (*c*) Keep the back arched!

Pull back hard with the head and chest and attempt to swing the feet down and under the body.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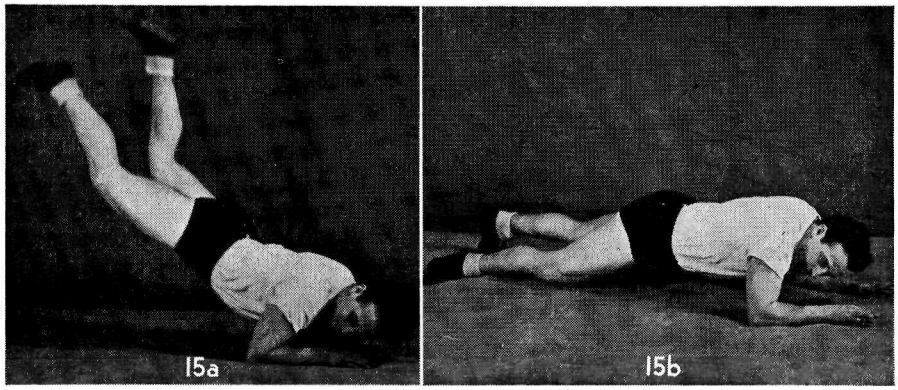
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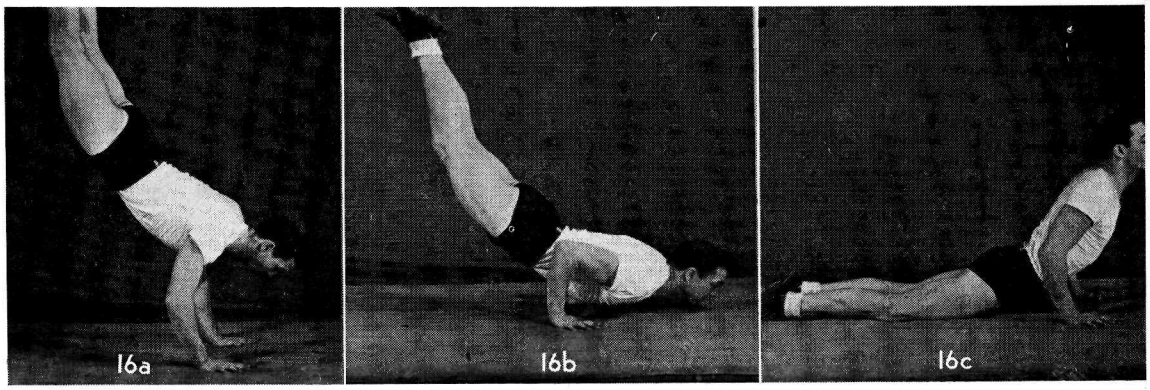
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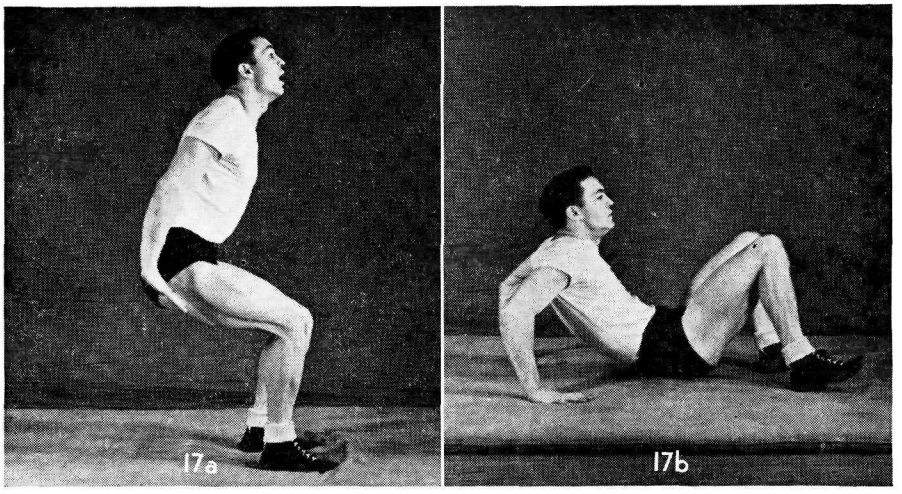

17—*Feet First with Forward and Downward Momentum.*—(*a*) Use the slapping principle; have the feet absorb the shock; (*b*) Fingers pointed forward—Lean backward to counterbalance forward momentum—Keep the chin on the chest—Cushion the body to the deck!

When falling from a height and the lean is too far forward for landing on the feet alone, and not quite enough to do a dive and roll, the performer lands on feet and hands at the same time.

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18—*Hands and Feet Together.*—(*a*) Lean backwards to counterbalance the forward momentum; (*b*) Fingers pointed forward—Flex the legs and arms simultaneously upon landing!

If the momentum is in a sideward direction, for example, a football or a basketball player may reach for a loose ball he should tuck and execute a sideward roll.

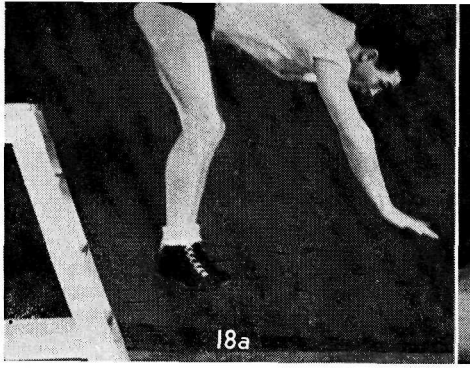
19—*Falling Sideward, Tuck and Sideward Shoulder Roll.*—Start roll low rather than high—Throw extended arms across chest—Roll on shoulders rather than small of back—Keep tucked all the time!

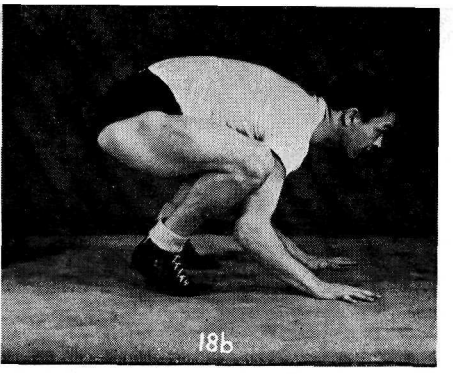
If falling with the back to the deck, try to turn about in the air and face the deck. Cushion the fall with the hands, and at the same time roll sideward or forward. If it is impossible to land on the feet, land on all fours, and cushion the body to the deck. The arms should be straight at the elbow and in a forward oblique position. Slap the arms to the deck as hard as possible, thus cushioning the body to the deck. The chin should be on the chest and the feet slightly in front of the head. A neck injury could result if the feet were beyond the vertical position. The "stage" breakfall, as it is called, is used effectively in breakfall acts on the stage.

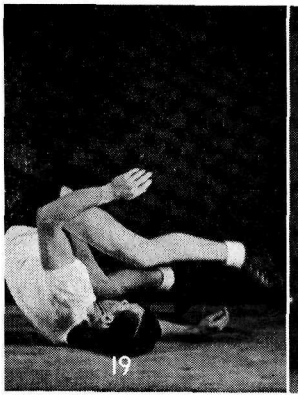
20—*Falling Backward from Height.*—(*a*) Chin on chest—Feet just short of the vertical position; (*b*) Fingers pointed forward—Arms straight and forward oblique—Slap the arms to the deck as hard as possible to cushion the fall!

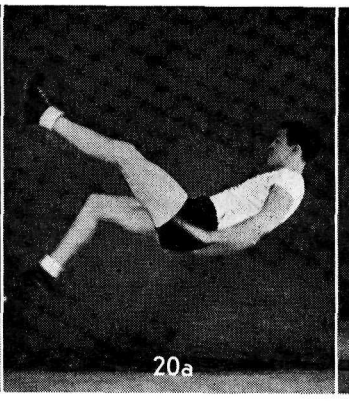
Elementary Learning Activity for the Breakfall

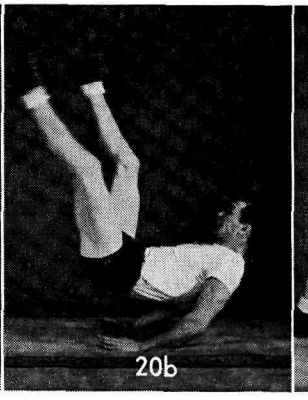
21—*Fall Forward.*—Fingers pointed forward—Head to the side to protect the chin—Cushion the body to the fall by flexing arms.

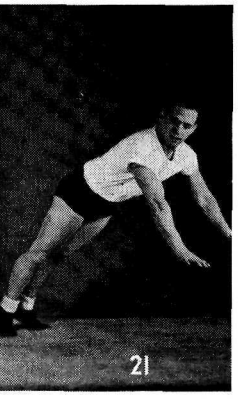


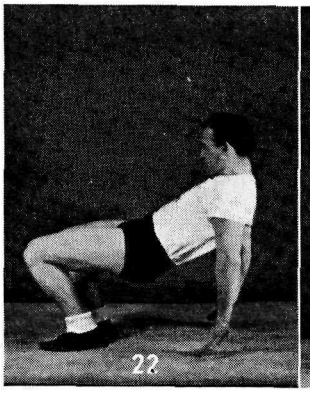


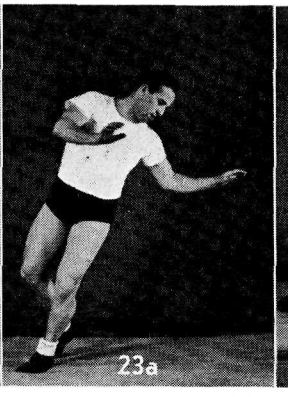


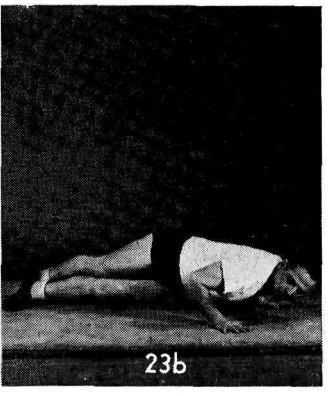










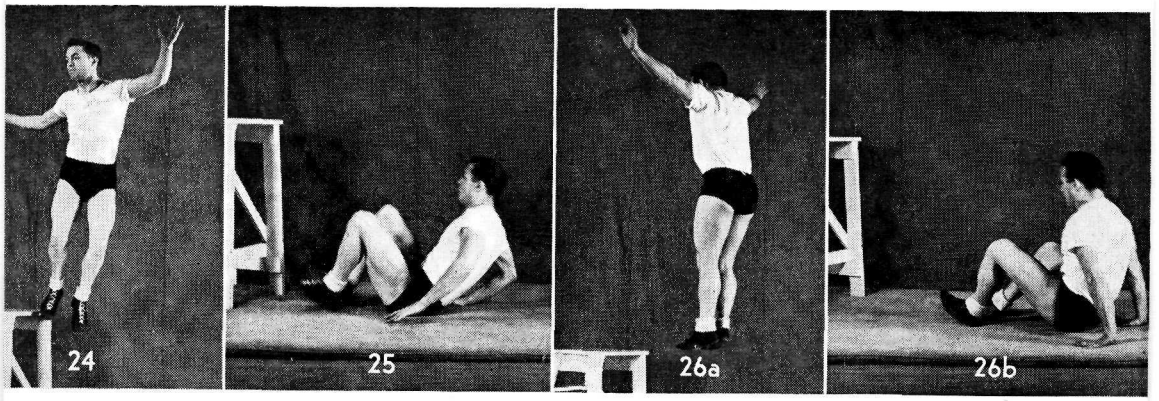


22—*Fall Backward.*—Chin on chest—Hands slightly behind hips—Fingers pointed forward—Hands hit deck before body!

Teaching Procedure.—It is advisable to first practice with a spotter who supports the performer's weight with one hand on the neck. He places the performer's hand on the deck, slightly behind the hips, the fingers pointing forward. The heel of the hand should hit the deck first.

23—*Backward Roll, One-half Turn, Forward Breakfall.*—(*a*) Do not stop before turn—Turn while momentum is still backward; (*b*) Land on hands first!

Teaching Procedure.—This activity should stress the point that the attempt should be made to fall forward rather than backward.



24—*Jumping Forward from a Height, Feet First.*—Jumping forward from a height with one-half turn and backward roll.

25—*Jumping Backward from a Height and Backward Roll.*—Lean inward toward the fall—Keep leaning forward on backward roll!

26—*Various Kinds of Jumps, Turns, and Rolls from a Graduated Platform.*—(*a*) Lean inward toward the fall; (*b*) Keep leaning forward on backward roll!

Summary

In summary, a well-functioning program of gymnastics and tumbling may be conducted with a minimum of accidents if the following are emphasized:

1. The importance of spotting or guarding in the gymnasium.
   a. The performer should understand clearly that it is his own responsibility to be sure that he is spotted properly.
   b. The performer should not be foolhardy.
   c. The performer should never change his mind in the middle of a trick.
2. The grasps, triceps, and abdominals of the performer should be built up through progressive strength-building exercises before he tries swinging tricks.
3. The important principles of falling safely should be overlearned by the performer.
   a. Slapping the mat with the arms.
   b. Slapping the mat with the back of the leg below knee, if necessary.
   c. Fingers pointed forward if falling backward.
   d. Cushioning the fall by bending the knees upon alighting.
   e. Tuck and roll forward, sideways, or backward whenever possible.
   f. Turning forward and face the fall if possible.

The breakfall is of decided value in all sports or activities in which injury from falling may occur.

APPLICATION OF TUMBLING AND JUMPING ACTIVITY TO PARACHUTE TRAINING*

Much of the material taught in gymnastics and tumbling may be applied directly or indirectly to parachute training. For example, rope climbing (See p. 168), the "trainasium," high bar, and many other training devices all contribute to the development of upper body strength. Excellent training could be supplied by the flying rings. An individual could be pushed in such a manner that he would acquire a crooked swing which he would be forced to straighten out. Such training would develop the muscles needed by the paratrooper to prevent oscillation of the chute during descent. (See Plate 27a) The traveling rings, too, could be used for this purpose.

In actual parachute training, the paratrooper must master the art of: (1) Landing and falling safely; (2) Jumping from platforms and correctly learning to absorb the shock of landing; (3) Jumping from a 200 foot tower while suspended in a harness; (4) Jumping from a tower free; (5) Sliding speedily down an inclined beam to adjust to horizontal velocity. (Nos. 1-5 inclusive prove need of tumbling training.); (6) Controlling the chute in descent and when he is being dragged by a wind machine. (This proves the need of upper body strength.)

In parachute landing, it is necessary to maintain the sitting position with the knees bent and relaxed rather than attempting to keep an upright position. Emphasis should be made to fall and roll, release and give in all types of falls. Under no consideration should you fight the fall.

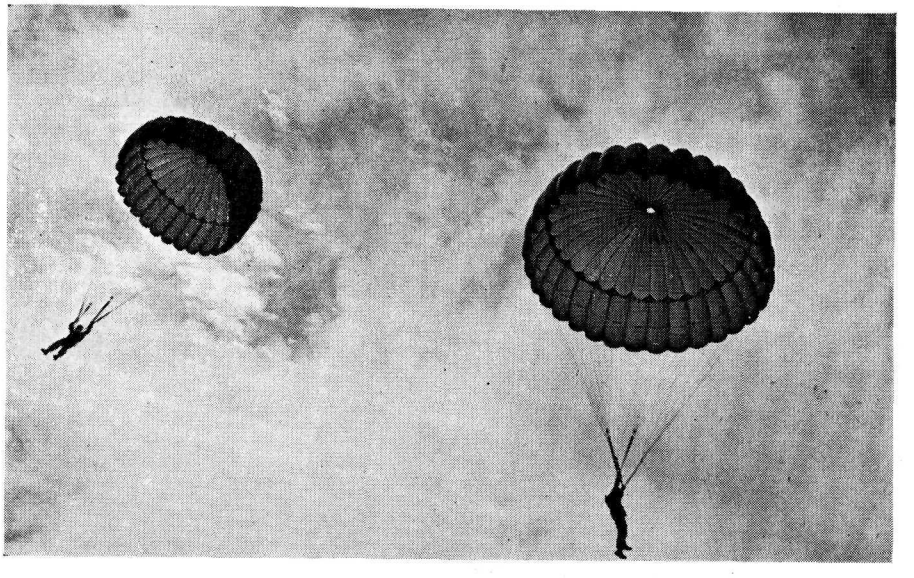
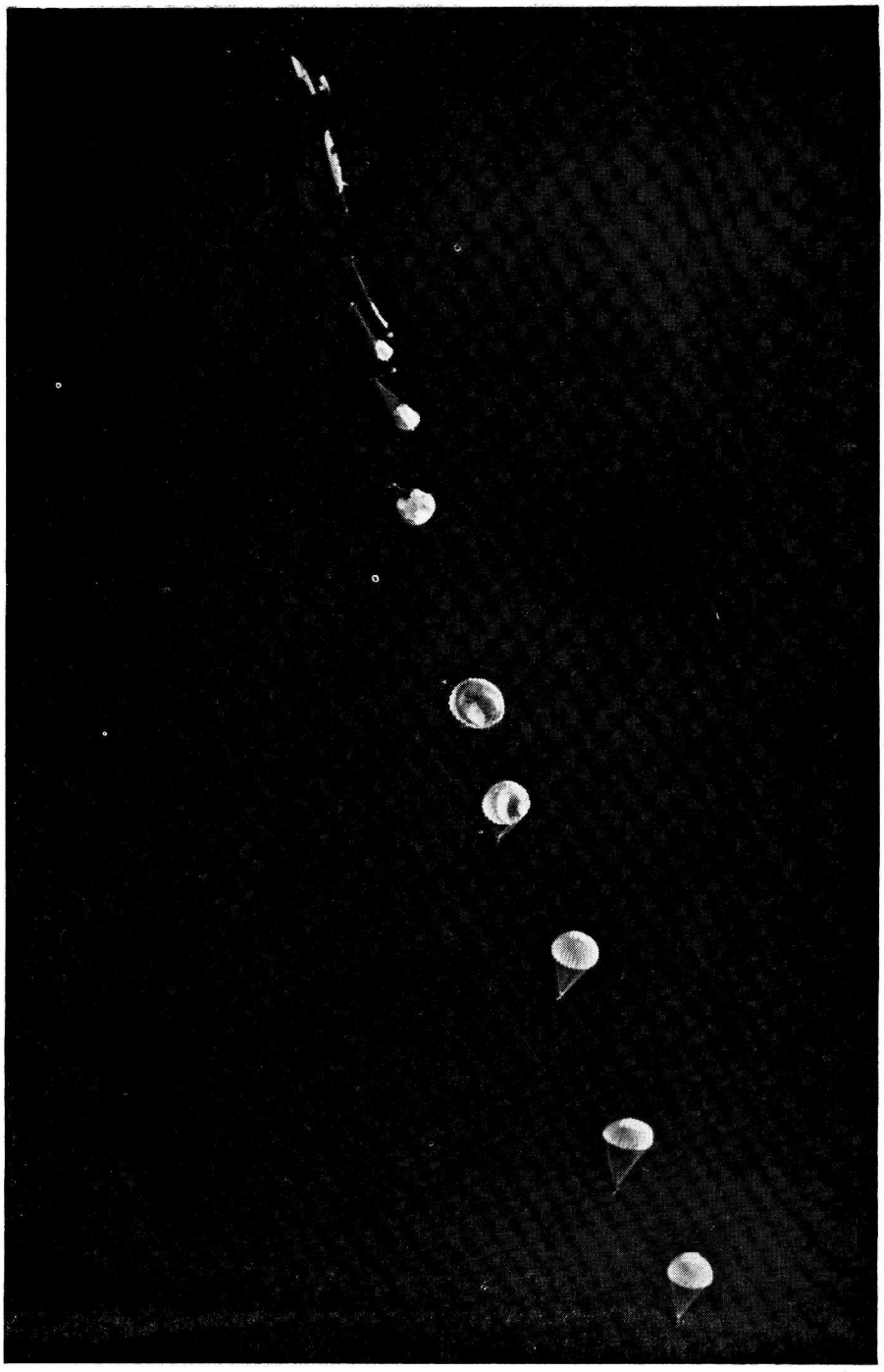


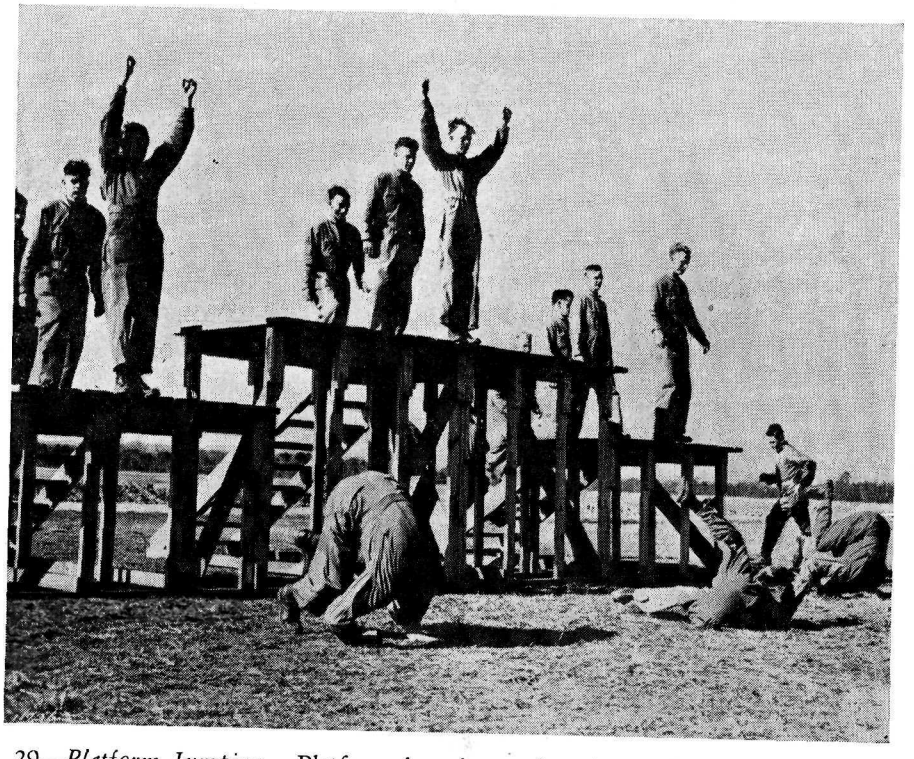
PLATE 27a

* Also refer to 16 mm. Film on Marine Parachute Activities NN-18.

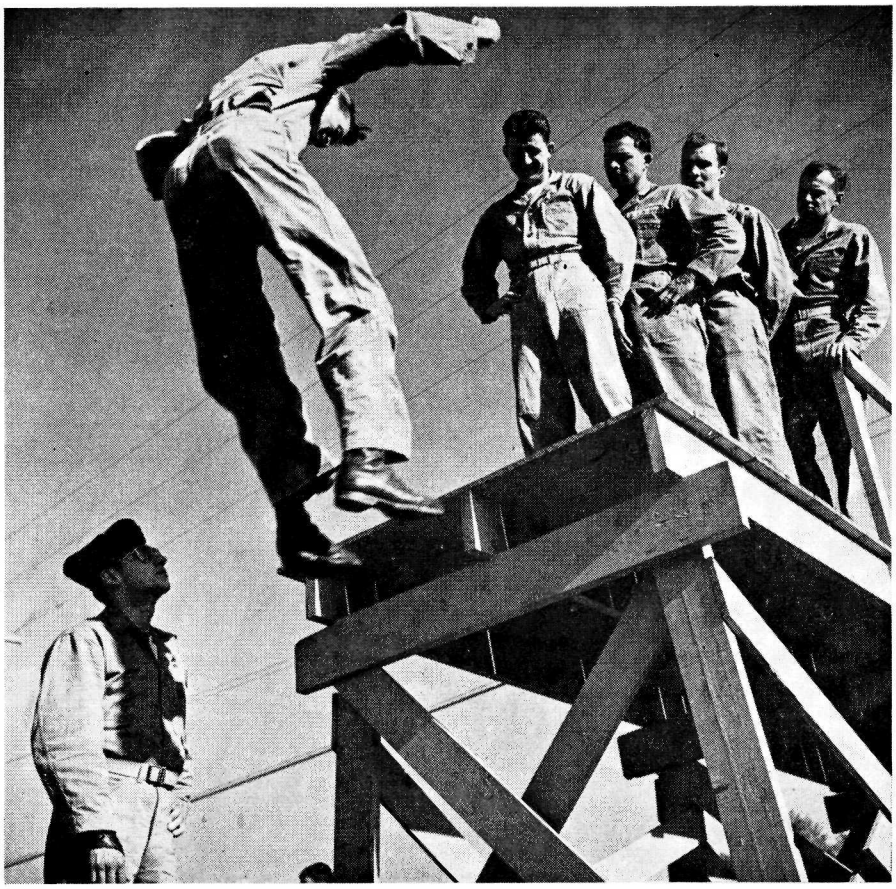


27b—*Paratroopers in Action.*—Practice jumps are usually made from a height of about 1000 feet but when in combat, jumps are made from a much lower height.

28—*The Importance of Leg Conditioning.*—The all out effort activities in the gymnastic program include development of leg exercises. The squat jump in particular, which is a core requirement for every aviation cadet, represents one of the best leg developers.



29—*Platform Jumping.*—Platform jumping and various rolls indicate the need of tumbling versatility. The same type of tumbling is given to cadets early in their training. This teaches them to tumble and fall in all possible body positions without injury. Body control and a sense of direction are required while in the air.



30—*Backward Jump.*—The jump pictured here is similar to a backward jump from any height. The cadet is taught to bend the upper trunk forward; use the arms and head to control upright balance while in the air; look towards the deck; land on the balls of the feet with the legs slightly apart to insure a well controlled landing.

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31*a*—*Backward Parachute Roll.*—This roll requires the mastery of the following tumbling skills: (1) The controlled backward jump from a platform at a prescribed height; (2) The backward shoulder roll; (3) Falling flat in a prone position. Excellent control of the body is essential during the jump as well as the ability to respond in a well coordinated way while revolving through an inverted position.

31*b*—*Shoulder Roll on Right Shoulder.*—The landing is made forcefully on the balls of the feet, knees bent. The body is in a tucked position. The arms are close to the body and the chin turned to the right and tucked to the chest. The standing position is assumed as quickly as possible on completion of the roll.

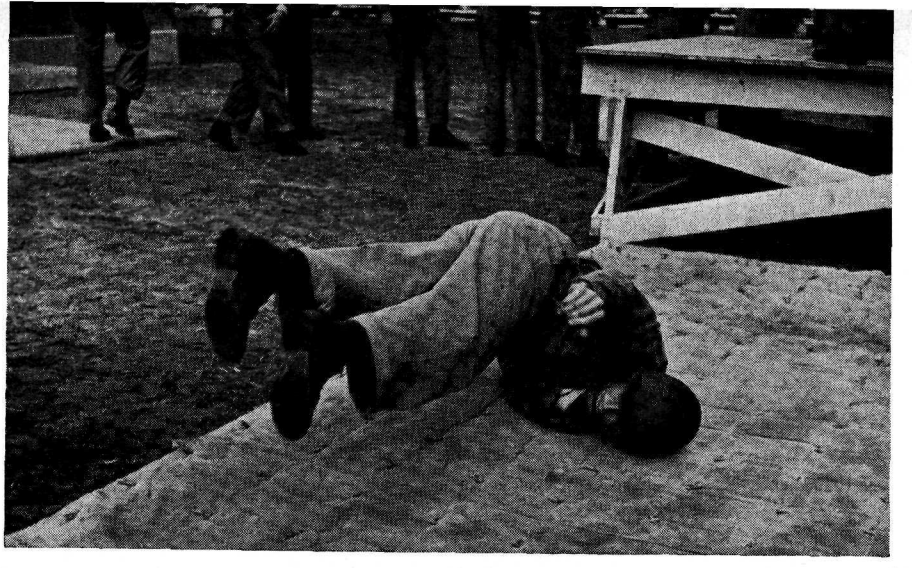

PLATE 31a

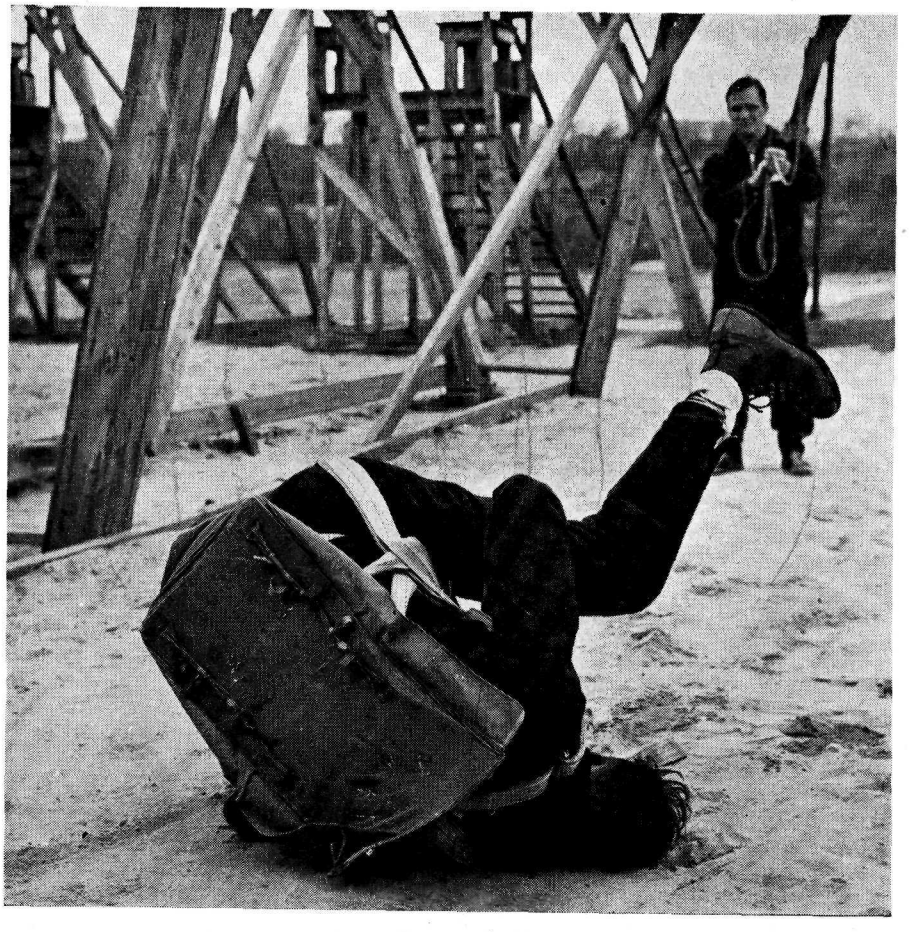

PLATE 31b

31*c*—*Group Work in Tumbling.*—This backward roll to the side and over the shoulder shows the tucked position of the body and the equal distribution of body weight on the side of the head and shoulders. The hands, in some cases, are used to help balance and equal weight distribution. However, the principle involved is a roll without the use of the hands. The completed roll (not shown) ends by keeping the hands clear of the deck, extending them to the front and at the same time clapping them together. This will control the arms and prevent injury to the elbows and arms.

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32—*Rolling Parachute Landing.*—The coordination of rolling while in a chute gives the second progressive stage of a backward shoulder roll. Notice the following: (1) The body assumes a tucked position. (2) The roll is executed on the right shoulder. (3) The chin is kept close to the body. (4) The arms are pulled toward the chest.

33—*Rolling After Parachute Landing.*—The necessity of correct procedure in falling and rolling backwards is illustrated. (1) The feet have hit the ground. (2) The body has been eased down by knee flexion. (3) The arms are held close to the body and have not been used to break the landing shock. (4) The combined action of leg flexion and a backward shoulder roll complete a safe landing.

PLATE 32

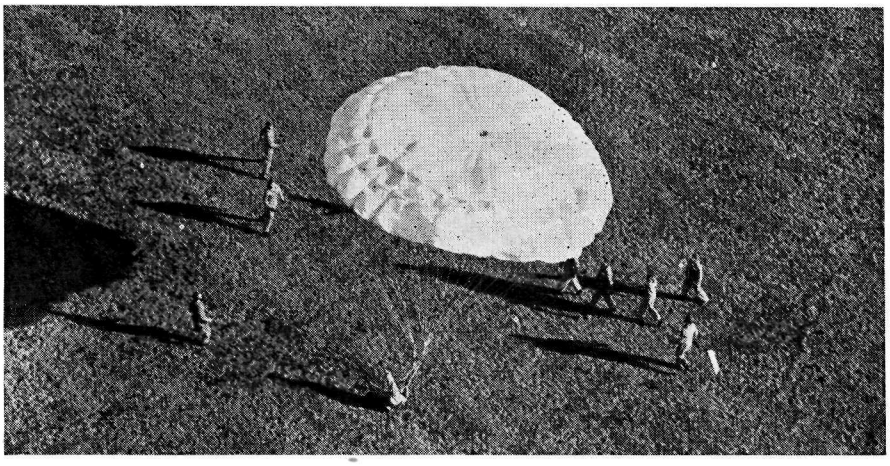
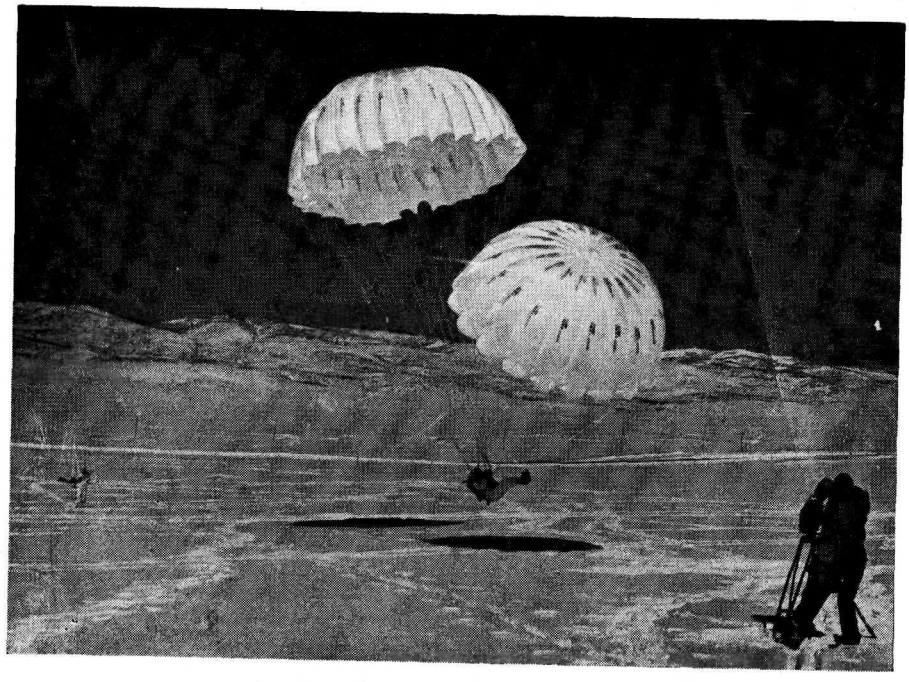


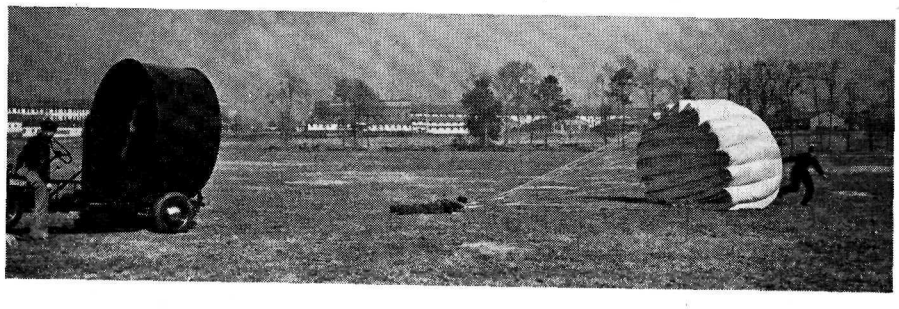
PLATE 33

34. *Backward Roll in Parachute.*—Perfect control of the body and excellent upper body strength are needed to successfully control the chute or complete the landing illustrated. The training received by cadets in tumbling, vaulting and climbing contributes to agility, body control, and upper body strength factors required in safe parachute landing.

Don't Fight the Fall!



35—*Preparing to Roll on Landing.*—This is an unusual illustration showing an approaching landing by the use of a second and emergency chute. The body will hit the ground in a seat or foot drag position. The action of the chute will cause the body to be pulled backward. The fall should be broken by the action of the knee flexion and bend. The body then tucks and a follow through is executed by the legs as the body goes into a backward roll.



36—*Foot Drag.*—The completed foot drag fall is shown. The body has been pulled off balance by the chute and the shock of hitting the deck has been taken up by the hands and bent arm position. Dragging the feet is a method of slowing down the fall and getting the body ready to absorb the landing shock. Usually there is not time enough to twist, tuck or roll.