

NIGHT AND VISION.

Importance of Cultivating the Vision at Night - At night, one is able to see according to the degree of darkness. The amount of vision also differs naturally and it is important to know the amount under various circumstances. Especially is this true under circumstances where the judgment cannot be formed by hearing, i.e., in rainy weather, or under other noisy conditions, where vision, though insufficient, is superior to hearing. Therefore, the training of the eye at night is a most important matter, as, to a certain degree, it can be strengthened by experience and practice. In the Japanese Russian War, the judgment by sight of soldiers accustomed to the terrain and to night movements, was surprisingly good, and was entirely due to experience.

Vision at Night Can Be Improved by Training - One accustomed to night movements, compared to one not so accustomed, is much more able to form correct judgments by sight; for experience sharpens the nerves and increases the faculty of attention. From indications, from methods of comparison, together with other assisting factors, one's judgment soon becomes accurate.

Night Vision-Detecting and Losing Sight of -Vision at night differs in degree, also, according to the concentration of attention; in this connection, the following principles are from my own experience:

1. When you follow with your eyes a thing once discovered, you will be able to see it for a long distance.
2. The distance at which you first discover an object, is less than the distance where you lose sight of it. Therefore, at night, when you lose sight of an object you have once discovered, it is difficult to find it a second time. When you follow it with your eye vision is easy, and the distance at which the object is visible becomes much greater, especially if there are supplementary indications. In such a case a thing liable to be unnoticed, will be seen by the observer.

Night Vision and Objects, and the Colour of Surrounding Objects - The colour of the dress has great bearing on vision; and I have learned the following facts from my own observation:

1. On a dark night a white coat can be seen farther than a black one.
2. When there is moonlight, often a black coat can be seen farther than a white one.
3. In any case, a light brown or mouse colour can be seen a long distance.
4. A black colour against a black background is more difficult to see than white; the latter against white surroundings is more difficult than black.

From these facts, the importance of bearing in mind the colour of surrounding objects when fixing the kind of dress, or determining one's movements, is apparent.

Night Vision and Relations of Light and Shadow - Night vision differs greatly according to one's position relative to a luminous body and shadow:

1. When a luminous body, such as the moon, is faced, vision is decreased.
2. When the light is behind, vision is increased.
3. When a luminous body is overhead, the mean of increase and decrease is the same.
4. Even though facing the light, if it does not strike the eyes directly, it injures vision but little.
5. One can see when looking from darkness into light, but not when looking from light into darkness.
6. While holding the light yourself, only your own surroundings can be seen.
7. When a light is behind an object, the latter's outlines are clearly visible.
8. A black object or a moving object covered by shadow is difficult to see.
9. Small objects seem far away, and large ones seem near.
10. Bright objects appear near and obscure ones far away.

The above facts teach one that, when covered by dark objects, or when moving in the shadow, to look at the bright side from the dark as much as possible, and not have the light directly in front.

Relation of the Seasons to Night Vision.

1. In level, open country, the field of view is extensive.
2. In close country, the opposite is true.

Accordingly, from late in the autumn until the beginning of spring, on account of the grass having withered and the leaves fallen the field of view is extensive. From late in the spring until early autumn on account of the luxuriant grass and trees, the field of view is restricted. During the Manchurian winter (in level country), the field of view is greater than in Japan. In mountainous localities, trees are few, compared to Japan, and the field of view is correspondingly greater.

Night Vision and our own Posture.-In looking at objects which have ground objects in their rear, a standing posture is advisable; without such objects in rear, a low posture is best. Therefore, to avoid being seen, take a low posture; if moving, keep physical objects in your rear. Even though such objects are distant, they will be of great assistance.

Night Vision and Field Glasses.-Whenever there is light at night from moon or stars, and at twilight and dawn, field glasses will double the power of vision. However, as the glasses narrow the field of view, it is dangerous to depend upon them, except to confirm a thing already seen, or when the locality in which the object to be seen, will appear and move, is fixed.

METHOD OF TRAINING NIGHT VISION.

General Principles.-In this training, have the men learn thoroughly the preceding principles. After they have become somewhat experienced, teach them the subject of relative vision under all kinds of circumstances. This will give them a suitable standard of judgment; and it is most necessary that the soldier have various kinds of experiences, so that he may learn how to act when alone.

Important Points of Training --

1. The execution of movements at night, without reference to the amount of light. In this case, the following training is suggested for the vision:

(a) A single soldier moving quietly, first toward the soldier under instruction, and second away from him. The reason for the quiet movement is to prevent any assistance from sound, thus training the soldier in relative vision.

(b) A single moving soldier allowing some noise, such as the noise of the bayonet scabbard, water in the canteen, footsteps, etc., first toward the man under instruction, and second a-way from him.

(c) A single soldier in different coloured clothing, both toward and away from the man under instruction.

(d) After a little while, increase the number of soldiers and have them move under the following conditions: 1. Quietly; 2. Under ordinary conditions; 3. With different colored clothing; Toward the one under instruction (discovery), and away from him (losing sight of).

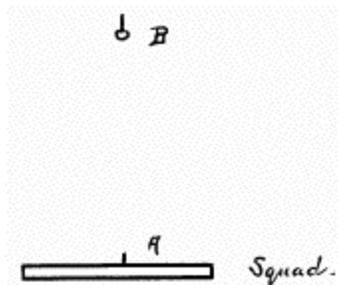
(e) With a squad under the same conditions as paragraph (d).

2. Taking the light into consideration.

- (a) With the light (moon, lantern, etc.), above and in the rear.
- (b) With the light at a high place in the front.
- (c) With the light in rear of the object to be seen. (d) When the object to be seen bears the light.
- (e) When the man under instruction bears the light.
- (f) When the object to be seen is on the sky-line, and when not.
- (g) Movements in the shadow.
- (h) The relation between one hidden by an object and one covered by a shadow.

The above practice should be carried out, first, quietly; second, under ordinary conditions; third, with different coloured uniforms.

Methods of Training - When the number of soldiers under instruction is small, one instructor supervises the instruction in one squad; if the number be large, there will be assistant instructors in charge of each squad. The instruction of all squads will be carried out at the same time, taking care that they be so placed so as not to interfere with each other.



For example, place a squad at A. From this squad send one man (later several men) in the direction B. When he is about to disappear from view, halt him and estimate the distance. Again, based on these principles, send one man (later, several) outside the field of view, in the direction B. with instructions to advance toward A. When he enters the field of view, halt him and estimate the distance.

Try these experiments just mentioned in the following cases and make each man judge distance, etc., for himself, first, quietly; second, under ordinary conditions (singly, several men, squad); third, with different coloured uniforms.

Experiments - When this kind of training is finished cultivate the understanding and power of judgment by movements at will over various kinds of terrain and under varying conditions of weather, darkness, etc. Teach them to utilize trees, light, terrain, etc., the

instructors correcting and criticizing the movements. For example, form the men into a squad, and have other soldiers, from a considerable distance outside the limit of vision, move toward the squad, making use of light, terrain, shadows, etc., as already explained. The squad will watch and criticize the movements, the instructor also adding his criticism. Suitable occasions for teaching the relations of terrain, natural objects, weather, luminous bodies, etc.

HEARING AT NIGHT.

At night, on account of the difficulty of vision, the ears must be trained to listen attentively, and with judgment; the military objective must be attained by a combination of sight and hearing. Even when you cannot approach an object close enough to see it. In many cases, the terrain and the state of the enemy will enable you to accomplish your object by hearing. Again, in many cases, hearing enables one to judge of the proximity of the enemy, and of his movements. Therefore the scope of practical use of hearing at night is very extensive; and it is important that the hearing be well trained so that one may be able to guess all indications coming from sounds, and at the same time so plan his own movements so as not to furnish the enemy with such indications. On that account, it is necessary to have a criterion by which indications may be judged, and a self-consciousness by which one can regulate his own movements.

The Character of the Ground and Sounds.

1. If the ground be hard, the echo is loud.
2. If the ground be soft, there is but little echo.

That is, if the ground be hard, the noise is sharp; if soft, it is dull.

Kinds of Covering Substances and Sound - Noise varies according to the kind of covering substance; therefore it is very necessary to know the relative amount of sound when walking over various kinds of ground.

The Size of a Detachment and the Relative Weight of Materials - If a detachment be large, it causes a corresponding amount of noise; and can be heard at a distance; if it be small, the noise is small. If the materials be heavy, the noise carries a great distance, and if they be light, the contrary is true. These relations are coexistent with those of the character of the ground.

Weather -

1. **Rain and snow -**

(a) When rain is falling there are great differences in hearing, depending upon the degree of rain.

(b) When snow is falling, the amount of obstruction to noise, compared to rain, is small. When passing over snow, it varies according to the degree of freezing.

2. **Wind -**

(a) When there is no wind, conditions are excellent for hearing, as sound is not at all obstructed.

(b) When the wind is blowing, conditions are favourable for hearing sounds which occur in the direction from which the wind is blowing, and noises can be heard at a long distance. Opposite conditions produce exactly opposite results.

(c) Wind blowing in one's ears is disadvantageous, as the noise interferes with hearing.

3. **Time of night -**

At dead of night, surrounding noises can be heard better than at twilight or dawn.

4. **Relation of physical objects -**

In level open country, which has no trees, buildings, etc., to interfere with the transmission of sound, noises travel far.

5. **Relation of seasons.**

In the winter, not only is the ground frozen, but the leaves of plants, trees, etc., are fallen, the grass is withered and dead, and the crops cut and gathered; therefore, sounds travel especially far.

TRAINING IN HEARING AT NIGHT.

Important Points to be Considered - In the following training, have the men understand clearly the relations of the manner of walking, numbers and clothing, to the sound produced; then extend the training as follows:

1. The march of infantry.

(a) A quiet advance.

(b) Quick time not in steps (single soldier, several men, squad with and without arms, in different kinds of weather and over different kinds of ground).

(c) Quick time in step, under same conditions as (b).

(d) Double time.

2. March of cavalry.

This should be carried out whenever there is a good opportunity, conformable to the above principles.

3. March of artillery.

To be carried out as in (1).

4. The noise of entrenching.

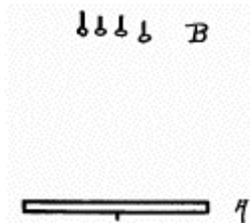
(a) The noise of digging with a pick.

(b) The noise of driving a shovel strongly into the ground.

(c) The noise of pushing a spade into various kinds of ground.

(d) The noise of a squad carrying on the work freely

Methods - The apportionment of squads according to the number of men is the same as previously described.



For example, have the necessary number of men advance from the squad at A, in the direction of B. Having faced the squad at A to the rear, have them listen to the noise of entrenching at B; when they can no longer hear it, halt the squad at B, and estimate the distance. Again, have a squad at B, approach the squad at A; when the latter can hear the noise, have them estimate the distance. This training should be carried out with a varying number of men, and under varying conditions of ground and weather. By such means, each man, individually, will learn the proper pace and manner of advance; the noise of working, also, will teach them how to use their tools with a minimum of noise. The following exercises, also, are important: The entrenching of a squad (of so many men) at what distance can it be heard, (a) in quiet weather, (b) when the wind is favourable, (c) when wind is unfavourable, etc.

Inferences to be drawn from Sound - To state it briefly, one who is accustomed to noticing sounds at night, is able to form his judgment of the causes by using the various inferences that may be drawn from such sounds. For this reason, such basic instruction is very necessary for soldiers; this instruction, also, will give them a basis for the guidance of their own movements. For this purpose, it is important to take advantage of every opportunity for instruction in comparing the causes which give rise to the sounds, to the sounds themselves, as for example, the march of a detachment, cavalry, wagons, etc. When well trained in this, the soldier will be able to guess the direction of march, the approximate position with reference to himself, distance, etc. If no good opportunities for such training present themselves, while moving on the many roads, or in their vicinity, listen to all the sounds which arise on the road and practice estimating their causes, direction, distance, etc.

It is very necessary to be able to judge by hearing, the noise of the enemy's artillery entering a position, and the entrenching of infantry. The Japanese-Russian War taught us the necessity of often changing our positions to conform to those of the enemy made during the night; and our only way of determining those movements was from the noise of batteries going into position, entrenching, etc.

Extract taken from –

NIGHT MOVEMENTS

Translated From Japanese

By C. Burnett