

ENCLOSURE (2)
REVISED
INSTRUCTIONS FOR OPERATION
AND MAINTENANCE
RADIUM PLAQUE ADAPTOMETER

A. GENERAL DESCRIPTION

1. The Radium Plaque Adaptometer is a portable device, entirely self-contained, for the rapid determination of night vision efficiency of personnel.
2. The instrument is housed in an imitation leather covered wooden case, 11-1/4 inches by 13-1/4 inches by 5-9/16 inches, with removable and interchangeable front and back covers. The total weight is approximately ten pounds. It is delivered in a wooden crate 14 x 17 x 8 inches, weighing 23 pounds gross.

B. DESCRIPTION AND OPERATION OF PARTS

1. The adaptometer consists of five major parts - a fixation object, a luminous plaque with superimposed Tee, a calibrated neutral filter, a shutter, and a control panel for operating the machine.
2. The fixation object is a lighted red cross at the top of the front panel. A flashlight lamp, "A", connected in series to two #6 dry cells, "B", illuminates the cross and also furnishes light for the control panel through the red filter "H". A switch, located at the top of the control panel operates this light.
3. The sheet steel, door type shutter is pivotally mounted on the front panel. The hinges are spring loaded for convenience and speed of operation. A small lever, "E", located at the base of the control panel on the operator's left, controls the shutter.
4. The neutral filter is hinged in the same manner as the shutter, with the operating lever "F" located in a corresponding position on the operator's right. The shutter must be opened whenever the filter is operated, or damage to the filter will result.
5. The luminous plaque is located directly behind the shutter and filter. The entire plaque is turned by a knob, "C", in the center of the control panel. The position of the Tee on the plaque is indicated by the letter on the knob opposite the indicator pointer on the back panel. Position may be determined by feel, using the projection, "D", on the control knob.

(Picture omitted - Will appear in Printed Copy)
Back view of Instrument with Battery Cover Removed.
(Taken from present instructions)

The small lug wrench taped to the floor of the control panel fits the set-screw which secures the control knob to its shaft. This screw must be kept tight at all times.

The plaque must never be exposed except in total darkness. Exposure to light makes the plaque so bright that even a night-blind man can see it easily.

If the face of the instrument is opened in the light for inspection or repair, the machine must be left in total darkness for four (4) hours before it is used for testing.

C. ADJUSTMENT, REMOVAL, AND REPLACEMENT OF PARTS

1. Should the battery or lamp require replacement because the working light burns out, the battery cover at the back of the instrument must be removed. Six wood screws hold this part in place.

2. The lamp unscrews as any ordinary flashlight lamp does. Spare lamps are provided in the cavities "G" uncovered by removal of the battery cover. This lamp is a standard Mazda #13, Navy #17-L-6340 (Type TB-3).

3. The dry cells may be replaced with any standard #6 cells. Series connections are used. Red wires should be attached to the positive (center) terminal of the cells.

4. If the filter holder or the shutter fails to open the full distance when the lever is operated, this can be corrected by adjusting the set screws on the shaft of the filter holder or shutter.

5. In case complete replacement of either filter holder or shutter should become necessary, the front panel must be removed from the instrument assembly. To remove the front panel the entire instrument assembly must be taken from the case. Remove the four wood screws at the corners of the front panel, and pull assembly forward through the front openings of the case. The front panel is held to the assembly by seven wood screws through the back panel. The lower two and the center one can be removed immediately. To reach the others, the battery cover and batteries must be removed as explained in Paragraph C-1 above. With the front panel free, the set screws on the shafts of lever controls "E" and "F" should be removed and the shafts can then be withdrawn to release the filter holder or shutter.

6. If it becomes necessary to replace the plaque, it is strongly recommended that the instrument be returned to the Naval Medical Supply Depot at Brooklyn, N. Y. If such procedure is not practical and if the proper equipment is available, replacement may be accomplished in the following manner: Remove the assembly from the case in accordance with paragraph 5 above. By then removing the set screws in the control knob the plaque holder can be pulled through the front opening of the panel. The plaque is held by several spring fingers and cemented in place with shellac. The assembly must be gently warmed to soften the shellac before lifting the plaque. In replacing the plaque the position of the original Tee must be duplicated so that the position indicator will show the correct position. When the plaque assembly is ready to be placed in the case, care must be taken to lift the positioning lever free of the square positioning cam on the rear of the plaque assembly. This may be easily done by reaching through the opening at the right edge of the instrument assembly between front and back panels with a pencil to support the lever. Replacing the control knob and set screw completes the assembly.

7. If the instrument is not in regular use, the plaque knob should be rotated weekly with abrupt stops in order to prevent the radioactive powder from settling.

This stirring up is particularly necessary on shipboard where vibration may aggravate the problem.

8. Care must be exercised that the front and back covers are properly held in place by the catches. These are located in the top of the case directly above the finger holes in the covers. Pressure must be exerted on the catches themselves when closing, or the covers are not fastened.

The instrument should be stored in a horizontal position, face down, when not in use. Aboard ship, some care should be taken to cushion the vibration of the ship against the instrument by placing the instrument on a pillow or folded blanket.

INSTRUCTIONS FOR ADMINISTERING THE NIGHT VISION TEST WITH THE RADIUM PLAQUE ADAPTOMETER

Under no circumstances report test results on subjects until you are thoroughly familiar with the procedure, and have tested at least 50 men under the supervision of someone experienced in giving the test.

KNOW YOUR JOB

The purpose of this test is to tell which men are so poor in Night Vision that they cannot be depended on to stand a good lookout watch at night. These men must be eliminated from the night watch, in the interest of the safety and fighting efficiency of our ships. You must always test with greatest care and conscientiousness, for a great responsibility rests on you. This testing procedure must be followed exactly; otherwise your results will not be dependable, and night-blind men may slip through.

The testing procedure is designed so that each man may be properly tested in the shortest possible time. When the test is given correctly, it runs off smoothly and no unnecessary time is spent in the dark.

This procedure is set up to determine as fast as possible whether or not a man can see at a very low light level. He is given enough trials to make sure of this.

A. EQUIPMENT

The following items essential to successful testing of night vision must be provided by each ship or station using a Navy Radium Plaque Adaptometer:

1. Darkroom. The test must be conducted with the subjects and the adaptometer in a completely dark, light-tight room. If the subjects are to enter or leave the testing room while a test is in progress, a light-trap or double set of doors should be provided so that light never comes into the room. If a light-trap or double doors are not provided, be sure that both the subject's eyes and the radium plaque are protected when the door is opened.

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2. Navy Red Dark-Adaptation Goggles. Every subject must be properly dark adapted before being tested. This may be done by wearing the Navy red-dark adaptation goggles for 20 minutes, followed by 10 minutes in the dark. If the adaptation goggles are not available, the subjects may be adapted by spending 30 minutes in the dark. Using these goggles, a large number of men may be adapted at once outside the dark-room. Then as many men as the testing room will conveniently hold may complete their adaptation while men adapted ahead of them are being tested. A close check must be kept to insure that each man spends his full time adapting. A man who is not properly dark-adapted will fail the test.

3. Chair and Chin Rest. These must be provided to make sure that tests are conducted at the proper distance from the adaptometer. A simple form of chin rest may be made by fastening a six-inch block of two-by-four to the top of the back of the chair. The top of this block should be rounded out and sandpapered smooth. With the chair facing away from the adaptometer and the subject straddling the chair, chin in chin rest, the possibility of his leaning forward is eliminated.

4. Table and Five-Foot Measure. The fixation cross of the adaptometer should be exactly five feet from the chin rest, and close to the level of the subject's eyes. The adaptometer should be placed on a table approximately 3-1/2 feet high, to be at the correct height. To insure that the five foot distance is accurately maintained, it should be measured, and the table and chair both secured to the deck if possible.

5. Test Cards. The following is a sample of the test card to be used. These may conveniently be mimeographed or printed on a 3" by 5" card.

FRONT

.....	PASS
Name	Rank/Rate	FAIL
.....
Date	Station	
Time GOGGLES ON.....		
Time INTO DARK.....		
Time TEST STARTS		
REMARKS:		
NIGHT VISION TEST. Radium Plaque Adaptometer.		

NEVER TEST UNLESS RED GOGGLES ON TWENTY (20) MIN. AND TEN (10) MIN. IN TOTAL DARK, OR THIRTY (30) MIN. IN TOTAL DARK, IF NO GOGGLES AVAILABLE:

BACK

R D L U L R D D R U Encircle classification on
U L D D R L U L U R BOTH sides of card.

D U U L R D L U R L PASS: 10/10
D R U L R D L R U D 16/20, 17/20, 18/20,
19/20

L D U R D L U R R U FAIL: 15/20, or less.
L R U L D D R L U D

Tested by:.....

The front of the card should be filled out before the subject enters the dark-room; the back is marked during the test. A supply of pencils should be kept with the instrument for the operator's use.

B. TESTING PROCEDURE

The fundamental testing procedure must be so familiar to you that you can run through it without hesitation. Be sure that you know it thoroughly.

1. Whenever possible give a description of the test to the men before they enter the dark room. A cardboard mock-up of the adaptometer will be very useful.

2. Before testing, make sure that the men to be tested are fully dark-adapted.

3. After the first subject has been in the dark ten minutes, take your place behind the adaptometer, and remove the front and back covers from the machine. Turn on the fixation and working lamp, make sure that the subject is in the testing chair, and that he has removed his goggles; then begin!

a. Call the man's name from the card. "Is your chin in the chinrest? Do you see the red cross? All through the test look straight at the cross. Remember, keep your eyes on it all the time; don't look anywhere else." Open the shutter and filter and expose the figure at the practice level for several seconds. "Do you see the plane beneath the cross? Which way is it pointing?" Close shutter, change position of Tee, reopen shutter. "This time?" If the man calls the position of the plane correctly from the start, give four exposures, one each with the plane in the four positions. Be sure to practice ahead of time with the Control Knob so that positioning the target can be done quickly and accurately. If the man does not answer promptly, name the direction of each

exposure for him until he recognizes them; then let him start calling them himself. As soon as you are satisfied that the man understands his job and is calling the exposures correctly, close the filter and use the testing level.

b. "All right, we're ready to go. When I say 'Ready', the plane will flash on. Each time it appears, tell me which way it is pointing. If you're not sure, play any hunches you have. It's always better to guess than to say you don't know. Don't be afraid of guessing. All right now? Look at the cross! Ready!" Open the shutter, and close it as soon as the subject has answered. Never leave it open longer than four to five seconds. You will find that a one-second exposure is long enough for most subjects.

c. A good technic to use when a tone of uncertainty appears in the responses is to repeat the man's answers on each trial and add, "That's right, keep trying." This should not interrupt the rhythm of testing. Throughout the test, strongly encourage guessing when the man is slow to answer. Ask him "How about a guess?" or "Any hunch?" Remind him frequently to keep his eyes on the cross. The scoring system has already been designed to include the subject's guesses.

4. Success in testing depends very much on your manner of giving the instructions. The light level is so low that most of the subjects will often feel uncertain and hesitant about responding. A friendly, encouraging manner will give them confidence and help them to respond correctly. An abrupt or impatient manner will provoke many "Don't know's," and may even antagonize the subject. When this happens, the test is surely not valid, for complete cooperation of subject and operator is essential for good test results.

The subject should be encouraged to reply quickly. Try to establish an even rhythm of testing - i.e., exposure - reply - exposure - reply. With practice, positioning the target and recording errors will become mechanical and should not disturb this rhythm.

5. Additional rows are supplied in case the subject did not understand your instructions. To mark the cards, simply draw a line through the trial on which a man fails to give the correct answer, whether he gives a wrong reply or says "I don't know." If he changes his mind after answering, always score him on his second reply, whether it is right or wrong. Never open the shutter a second time on the same trial, even though he may ask you to.

6. The actual score is recorded as the number of targets reported correctly out of the total number of trials given. For example, if 14 correct responses are given out of 20 trials, the score is recorded 14/20, and the classification FAIL is encircled.

7. The test procedure is designed to speed up the testing of men by giving each man enough trials to make sure that he should get a particular classification.

First ten trials. If all ten trials are correct, stop the test. If less than three are correct, discard the results and re-instruct the subject until you are sure that he understands the test and that he is really trying. Then begin the test again on the next pair of lines.

8. Grading

The following scores give a grade of PASS:
10/10, 16/20, 17/20, 18/20, 19/20.

The following scores give a grade of FAIL:
15/20 or less.

The classification which each man receives should be encircled on both sides of his test card.

9. When testing of a group of men has been completed, be sure to turn off the fixation cross, and replace both covers on the machine before any lights are turned on in the testing room. This is important to prolong the life of the battery, and to make sure that the plaque is never exposed to light.

10. Short form of instructions: After you have developed your skill in handling the adaptometer and in testing men, you will find that you can shorten the instructions when men are waiting to be tested in the same room as the adaptometer. These men will have heard the test run through, and will have an idea of what they are to do. The instructions may become as brief as: "O.K., (man's name), chin in the chin rest? Remember, keep your eyes on the cross all the time. Which way is the plane pointed? This time?"--etc.

11. Even though these instructions are carefully followed, some subjects will have difficulty with the test. It may be that they did not understand your directions, or that they are not really trying to pass the test. When a man is doing poorly because he does not seem to understand the task, open the shutter and move the filter out of the way. Ask him if he sees the cross and the plane, and explain to him that he must look at the cross all the time. Tell him which way the plane is headed. Tell him that it doesn't move. Give him repeated practice trials, and instruct him over and over until you are sure that he understands the job.

Some of these men will not look at the fixation cross, but will look straight at the plane. If this seems to be the case, open both filter and shutter and tell the man to look back and forth from the cross to the plane. Ask him if he cannot see why you want him to watch the cross - how much clearer the plane stands out when he is looking at the cross. Tell him that he'll be through much sooner if he watches the cross and gives the correct answers. Stress the fact that answering correctly will shorten the test.

Men who are not trying to pass the test are more difficult to handle than the men who fail to understand. It will take all your skill and experience to detect these men and to obtain a correct test score on them. They are more commonly spotted in two ways: First, they often get all their trials correct at the practice level without difficulty, and then say they can't see anything at all at the test level - not even the lighted area. Second, they give incorrect answers on all the trials at the test level. This is almost impossible to do unless they see the plane, since by guessing they are bound to get some right.

When the man is reporting incorrectly on all the trials at the test level, tell him that he can't possibly be wrong all the time, and that he must be able to see the plane. Tell him that he must have misunderstood the instructions and to try

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again. Then give him a few more trials at the practice level and go on with the test.

When you are sure that the subject has not been trying, always give him an "out", an alibi, so that he can start giving the right answers without having to admit that he was careless. Suggest that he may have his goggles on, or that he was not looking at the cross. Otherwise he will often persist because he is ashamed to have done so poorly.

The operator should do everything in his power to encourage and persuade the subject to passing. It is not difficult for a man with adequate night vision to fail the test through misunderstanding, carelessness, or poor physical condition of a temporary nature. It is impossible, however, for a man who cannot see to guess himself into the PASS category, provided:

1. The plaque has not been exposed to light.
2. The subject is seated at the proper distance from the machine.
3. Exposures are never longer than 4-5 seconds.
4. The operator is careful not to hint the correct answer.

12. The test reports should be entered in health and service records. The following are sample rubber stamps, now in use:

a. Service Record

U.S.S.....
 Date.....
 NIGHT VISION TEST with Radium Plaque ADAPTOMETER.
 PASS.....FAIL.....

b. Health Record:

U.S.S.....
 Date.....
 NIGHT VISION TEST with Radium Plaque ADAPTOMETER.
 PASS.....FAIL.....

Note: Men who are FAIL should not be used for night lookout duties. Select lookouts from the PASS group on the basis of other qualifications.

RETEST after 6 MONTHS.

13. Final Instruction.

Always be careful and conscientious. The results of this test will determine who is and who is not visually qualified to perform night duties. Errors in recording, and short cuts not allowed by the instructions may ruin your results.

1. Be careful - follow instructions exactly.
2. Always be sure the plaque has not been exposed to light.
3. Make sure that every man has been fully dark-adapted.

DON'T LET A NIGHT BLIND MAN STAND A LOOKOUT WATCH'