

MEDICAL RESEARCH DEPARTMENT



U. S. Submarine Base
New London

(Fulton)

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REPORT ON THE STANDARDIZATION OF NIGHT LOOKOUT STAGES

Interval Report No. 1
Bureau of Medicine and Surgery
Project X-350 (Av-197-p-)
"Predictive Value of the Navy Radium
Plaque Adaptometer and Other Physiological
Measures of Night Vision for Score
on Performance Approximating the
Standing of a Night Lookout Watch"

Prepared by
Lt.(jg), W. S. Verplanck, H(S), USNR

24 May 1945

APPROVED: Captain C. W. Shilling, (MC), USN, MO-in-C.

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REPORT ON THE STANDARDIZATION OF NIGHT-LOOKOUT STAGES

SUMMARY

The Medical Research Department, U.S. Submarine Base, has received reports of the results of Night Lookout Training from 40 activities throughout the Navy. These reports include data on more than 500,000 men trained following a standard procedure.

Each report has been analyzed with respect to the percentage of men sighting the target at each brightness level and at the corresponding voltmeter setting, and median values for all reporting activities have been derived.

With these data used as a basis, each activity has been advised as to the proper voltmeter settings to employ, so that the training at the great majority of reporting activities has been rendered relatively uniform.

In accordance with its designation by the Bureau of Naval Personnel as Experimental Station for Lookout Training, the Medical Research Department, U.S. Submarine Base, New London, Conn., during the period 1 March to 7 August, 1943, experimented with a variety of procedures for elementary Night Lookout Training, using the Night Lookout Stages distributed by that Bureau. The most satisfactory of these procedures was selected. A report* describing this procedure and recommending its adoption was submitted to the Bureau of Naval Personnel.

Basic Procedure and Results:

The approved procedure is presented fully in ComSub-Lant "Handbook on Night Lookout Training", Revision One, of 1 May, 1943. It utilizes four levels of brightness defined in terms of the reading on the "voltmeter" on the trainer's control panel, and a fifth undefined level. Each man is required to search the simulated horizon for one minute for a target at each level of illumination. The brightness level at which he reports contact with the target is taken as his "score". The levels selected on the basis of the original data are given in Table I, together with the percentage of men sighting the target and reporting its correct relative bearing.

Table I

New London Contact Results

	<u>Voltmeter Reading</u>	<u>Percent of Men Making Contact</u>	<u>Cumulative Percentage</u>
Level I	9	20	20
Level II	12	20	40
Level III	15	33	73
Level IV	25	25	98
Level IV*	25*	2	100

* Report on Night Lookout Training Procedures, Medical Research Department, U.S. Submarine Base, New London, Conn., of 2 September, 1943.

Plan of Standardization:

The Night Lookout Stage is not, and was not intended to be, a precision device. The lack of accurate voltage control and uneven illumination make application of precise statistical procedures ineffective and meaningless. Obviously, calibration and close check on the procedure followed at each stage would be the ideal method of standardization, but this was not feasible.

In order to improve a situation created by an unfortunate diversity of training procedures, a process of what might be called "physiological calibration" was undertaken. The following steps were used: (a) prescription of a standard procedure of training for all training stages, (b) accumulation and analysis of the results obtained by this standard procedure at each activity, (c) recommendation of modifications in voltmeter settings employed in the training procedure on the basis of the results obtained, at each reporting activity, and (d) continuation of this process until all training stages obtained results approximately the same, and such that training brightnesses presumably fall in the range 3.5 to 7.5 log nvl. The Bureau of Naval Personnel authorized that such a procedure be followed.

Instructions to Other Training Activities:

On the basis of the New London results, instructions were sent to all Night Lookout Stages in operations, defining the procedure and requesting that the voltmeter settings of Table I be used for the five training levels. It was further advised that if these voltage settings did not yield a percentage of contact reports at each level close to that given for it in the table, the settings be altered up or down to give approximately the correct percentages. Training sheets providing definite series of target positions were issued, together with report sheets on which were to be recorded the levels used (voltage and rheostat setting), and the number of men making contact at each level, each week. It was requested that completed report sheets be forwarded to this department at New London at eight-week intervals.

Samples of all these sheets may be found in ComSubs-Lant "Handbook on Night Lookout Training", Revision One, of 1 May, 1943.

Initial Results:

Reports covering the training of 532,567 men were received over a period of 11 months from 40 Night Lock-out Training Stages.* Plots of the cumulative percentage of men making contact at each of the five levels were drawn for each reporting stage, and medians were determined as a function of the voltage settings reported. These Navy-wide medians served as the basis of all later work. Results are given in Table II.

Table II
Navy-Wide Median Contact Results

	<u>Voltmeter</u> <u>Reading</u>	<u>Percent of Men</u> <u>Making Contact</u>	<u>Cumulative</u> <u>Percentage</u>
Level I	8	30	30
Level II	12	28	58
Level III	15	27	85
Level IV	25	10	95
Level IV+	25+	5	100

Standards Adopted:

These levels were considered satisfactory, even though they did not agree precisely with those obtained originally at the Medical Research Department. It was considered advisable to accept these percentages as defining the intensity levels to be followed, especially since they approximated more closely a normal distribution. Accordingly, activities where percentages making contact at each level fell within 10% of those figures were advised to continue use of their original training levels, and to cease submitting reports to New London. Sixteen stages fell in this category.

* See Appendix for list of activities sending reports.

Continuation of Procedure:

Cumulative percentage curves were drawn on the results for each of the remaining stages, and by interpolation the voltage readings which might be expected to yield the correct percentages were obtained. These activities were advised to employ the new levels, and to submit reports as soon as a group of 500 men had been run, using the new settings.

As further reports were received, cumulative frequency curves were again drafted. On the first rectification, 3 of 18 stages obtained satisfactory results. New levels were selected for the remainder, and the procedure was repeated.

Present Status:

This practice has continued to date. At the present time results on another 31,225 men have been received; 29 stages are now operating in the standard procedures; 5 have been decommissioned or have discontinued training for one reason or another; and 6 continue to report. 71 stages have never reported, so that the training there remains presumably unstandardized. It is unfortunate that this group includes the Naval Training Station at Sampson, New York.

Conclusions:

This procedure for standardization is based on a gross statistical analysis and on the cooperation of personnel in charge of Night Lookout Training at each activity. It is considered well worth the time and effort expended. Many of the stages were offering widely varying training, in some cases too difficult and in others absurdly easy. This program very probably ensures that Night Lookout Training, at least at the cooperating stations, is to a large degree standard and of uniform merit.

APPENDIX

LIST OF TRAINING ACTIVITIES SUBMITTING
NIGHT LOOKOUT TRAINING REPORTS

	Status of <u>Training</u>	App No. of Men Trained <u>Per Week</u>
AmphibTraBase, Camp Bradford, Va.	Standard	500
Anti-AirTraCen, Point Montara, Cal.	Disc.	0
Anti-AirTraCen, Shill Beach, La.	Standard	200
Armed Guard Base, Solomons, Md.	Active	300
Armed Guard Center, New Orleans, La.	Standard	100
Armed Guard Center, T.I., Cal.	Standard	250
Armed Guard Gunnery Sch., N.Y., N.Y.	Disc.	1000
NavActivity #4, Nav #138, FPO, N.Y.,	Standard	20
NavRecBarracks, Portland, Oregon	Active	30
NavRecBarracks, Tacoma, Wash.	Standard	60
NavRecSta, Boston, Mass.	Standard	150
NavRecSta, Bremerton, Wash.	Standard	150
NavRecSta, Charleston, S.C.	Standard	70
NavRecSta, Lido Beach, L.I., N.Y.	Standard	50
NavRecSta, New Orleans (Algiers), La.	Standard	70
NavRecSta, NOB, Norfolk, Va.	Standard	100
NavTraSch, Bainbridge, Md.	Standard	850
NavTraSch, Harvard Univ., Cambridge, Mass.	Active	60
NavTraSch, Farragut, Idaho.	Standard	2800
NavTraSch, (Ind), Ft. Schuyler, N.Y.	Standard	200
NavTraSch, Great Lakes, Illinois	Standard	5550
NavTraSch, Newport, R.I.	Standard	950
NavTraSch, DD and DE Pre-Commission- ing Program, Norfolk, Va.	Standard	650
NavTraSch, San Diego, Cal.	Standard	800
NavTraSch, (Local Defense), T.I., Cal.	Active	250
NavTraSch, (Ind), Tucson, Ariz.	Disc.	0
NavTraSch, (Advance Fire Control), Navy Yard, Washington, D.C.	Standard	40
Navy Yard, Mare Island, Cal.	Standard	70
Navy Yard, Portsmouth, N.H.	Standard	40

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	Status of <u>Training</u>	App No. of Men Trained <u>Per Week</u>
Section Base, Little Creek, Va.	Standard	900
Section Base, Portland, Maine	Disc.	150
Submarine Base, New London, Conn.*	Standard	200
S/M Maintenance Activity, Manitowoc, Wisconsin	Standard	10
Small Craft TraGen, San Pedro, Cal.	Active	300
U.S. Coast Guard Academy, New London, Conn.	Standard	20
U.S. Coast Guard Station, St. Augustine, Florida.	Active	90
U.S. Coast Guard TraSta, Glouster, Mass.	Disc.	10
U.S. Maritime Service TraSta, Hoffman Is., N.Y.	Standard	30
U.S.M.S. Officers' School, New London, Conn.	Standard	50
U.S. Motor Torpedo Boat Station, Portsmouth, R.I.	Standard	75

*Experimental Station.