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Deviations from thermal equilibrium in shock waves. 1940 reprinted 1959. 81p. (PB 161 102) \$2.25	93
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PHYSICS (con.)

Effect of temperature on the magnetic properties of silicon-iron, cobalt-iron and aluminum-iron alloys. July 59. 57p. (PB 161 078) \$1.50	88
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RESEARCH METHODS, TECHNIQUES, AND EQUIPMENT

Mass spectrometer system for materials: research summary report. Phase I. July 59. 31p. (PB 161 073) \$1.00	96
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ASTRONOMY

Astrophysics

Air Force Cambridge Research Center, Bedford, Mass.
THEORETICAL ANALYSIS OF THE PAR-SCOPE: AN OSCILLOSCOPE DISPLAY FOR WEATHER RADARS, by Edwin Kessler, III. July 59, 37p. 20 refs. Instrumentation for Geophysics and Astrophysics no. 12; AFCRC-TR-59-244.
Order from OTS \$1.00 PB 161 100

The PAR-Scope, an oscilloscope display for use with pulsed radars and fluctuating targets, uses gated averaged amplitude information as one coordinate and azimuth or elevation as the other coordinate; its display is a profile of the average reflectivity of the target for the radar waves. The PAR-Scope is operated with a scanning antenna, permitting simultaneous operation with the Range-Height Indicator or Plan-Position display. Such combinations provide means for rapid three-dimensional quantitative mapping of average reflectivity in the vicinity of the radar, and should be of importance in studies seeking to relate the distributions of radar weather echoes to the air motions. Theoretical analysis of PAR-Scope performance considers the response of the scanning system to spatial variations of average reflectivity and to the rapid fluctuations characteristic of weather echoes. It is shown that reflectivity distributions of major interest can be easily represented to an accuracy within 1 db of that implicit in the radar calibration.

Cornell U. School of Electrical Engineering, Ithaca, N. Y.

BIBLIOGRAPHY OF EXTRATERRESTRIAL RADIO NOISE: SUPPLEMENT FOR 1952, by Martha Stahr Carpenter. Rept. on Contract N6onr-401(22). 15 Apr 58, 89p. 134 refs. Research rept. EE-371.
Order from LC mi\$4.80, ph\$13.80 PB 143 350

See also PB 135 731

U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 33, No. 1

Pp. 1-110

January 15, 1960

Harvard Coll. Observatory [Cambridge, Mass.]
THE OPERATION OF A SOLAR OBSERVATORY AT SACRAMENTO PEAK, NEW MEXICO, by Donald H. Menzel, Henry J. Smith and Barbara Bell. Final rept. on Contract AF 19(604)146. 22 Dec 58, 34p. 55 refs. AFCRC TR-58-288.
Order from LC mi\$3.00, ph\$6.30 PB 138 810

Miscellaneous Operations included the improving of the photographic laboratory, devising of new processing techniques, and general collaboration on standardization of photographic procedures. Considerable new work has been done in the field of optical engineering, toward the long-range improvement of existing equipment and the construction of new accessories. Some attention given to the problem of automatic data reduction. Solar-Terrestrial Correlations studies have been carried on relative to geomagnetism, corona, sunspots, flares, and various terrestrial ionospheric effects. Theoretical developments in magnetohydrodynamics, the dynamics of ionized media, collision processes and shock waves, torsional oscillations and solar magnetic fields have simplified and clarified many important subjects. Another important theoretical study has been the development of new techniques for calculating the intensities of spectral lines of complex atoms.

Lowell Observatory, Flagstaff, Ariz.
THE COLOR-MAGNITUDE DIAGRAM OF THE PLEIADES CLUSTER II, by H. L. Johnson and R. I. Mitchell. Final rept. on Contract Nonr-1674(00) [1958] 17p. 13 refs.
Order from LC mi\$2.40, ph\$3.30 PB 138 610

Two or three-color photographic and photoelectric photometry of virtually all of the known members of the Pleiades cluster is given. The photographic photometry was done on plates taken with the 13-inch telescope, while the photoelectric work was done with the 21-inch and 42-inch reflectors of the Lowell Observatory. We believe that a number of the stars that were previously thought to be members of the Pleiades are actually not members. We find a total of 262 members and 27 probable brighter than $V = 16$. No white dwarfs were found; they would have been if they were brighter than $M_V = 11.8$. A sudden increase in the width of the main sequence is observed at $V = 12.0$. This scatter may be associated with the probable fact that the fainter stars

are still in the process of gravitational contraction. A "flare" of one faint Pleiades star was observed, and five other faint stars are thought also to be "flare" stars. It is suggested that the "flare" activity might be connected with the process of gravitational contraction of young late-type stars.

Manchester U. (Gt. Brit.).
RESEARCH ON MOON ECHO PHENOMENA, by
J. V. Evans. Final technical rept. for 1 May 56-
1 May 59 on Contract AF 61(514)947. [1959] 33p.
23 refs. AFCRC-TR-59-184.
Order from LC mi\$3.00, ph\$6.30 PB 143 520

The research work summarized is concerned with the study of radio reflections from the moon. Results have been obtained both at 100 Mc/s and 120 Mc/s which indicate that at these frequencies the moon behaves as a quasi-smooth reflector such that 50% of the returned power is reflected from a region at the centre of the visible disc having a radius of about 1/10th of the moon's radius. The echoes show long period fading which has been attributed to the magneto-ionic effect in the earth's ionosphere. By observing this fading on two close spaced frequencies it has been possible to obtain measures of the total electron content of the ionosphere. These results indicate that for most of the time there are three times the number of electrons above the height of the critical frequency to the number below. Hence the ionosphere must extend to about 1,000 kms. above the surface of the earth.

Minnesota U. School of Physics, Minneapolis.
AURORAL X-RAYS, COSMIC RAYS AND RELATED
PHENOMENA DURING THE STORM OF FEBRUARY
10-11, 1958, by J. R. Winckler, L. Peterson and
others. Nov 58, 36p. 12 refs.
Order from LC mi\$3.00, ph\$6.30 PB 143 418

Balloon observations were made during the auroral storm of February 10-11, 1958 at Minneapolis. Strong x-ray bursts in two groups were detected. The groups appeared coincident with two large magnetic bays, with strong radio noise absorption, and with the passage across the zenith of a very large array of auroral luminosity. From the x-ray intensity and measured energies an electron current of 0.6×10^{10} electrons/cm²/sec is present. These electrons ionizing the upper D-layer account for the increased cosmic noise absorption. The x-rays themselves are 1000 times less intense and do not provide sufficient ionization. Visual auroral forms during this storm are reported to have lower borders at the 200-300 km level. There is thus a difficulty in bringing the electrons to the D-layer without an accompanying visible aurora. A cosmic ray decrease accompanied the storm and was observed to be from 4% to 6% at sea level, 21% in the balloon altitude ionization, and 15% in total energy influx at 550 geomagnetic latitude. Compared to the great intensity of the magnetic and auroral phenomena in this storm, the cosmic ray modulation is not exceptionally large.

Northwestern U., Evanston, Ill.
A STUDY OF THE STARS IN THE ORION CLUSTER
(1) [AND] A STUDY OF THE GALACTIC CLUSTER
in PERSEI (2) by K. Aa. Strand. Final rept. on Investi-
gation and Research in Astronomy, Contract Nonr-

2115(00). Oct 58, 5p.
Order from LC mi\$1.80, ph\$1.80 PB 143 707

Brief comments were made on the several directions of research.

Ohio State U. Research Foundation, Columbus.
RELATIVE SOLAR INTENSITY OBSERVATIONS
AND ATMOSPHERIC TRANSMISSION OF STAR-
LIGHT, by Roger Hosfeld, George J. Neilson, and
J. Allen Hymek. Final rept. on Contract AF
19(604)2039. 1958, 22p. 1 ref. RF proj. 717;
AFCRC TR-58-259.
Order from LC mi\$2.70, ph\$4.80 PB 139 169

Under this contract a photoelectric photometer was developed for measuring the surface brightness of the sun by comparison with the intensity of stars during the daytime. A stepwise method of decreasing the solar signal was incorporated into the procedure. The signal reduction was accomplished by the use of objective and focal plane diaphragms, optical scattering, and electronic attenuation, with each step subject to calibration. The photometer also permits photoelectric examination of solar surface details of the order of 3 seconds of arc in diameter. Stellar scintillation studies carried out during this investigation were primarily concerned with the variations in scintillation signals observed through a rectangular aperture at different orientations in azimuth, and their relationship to wind direction and velocity in the earth's upper atmosphere. A compact, specialized telescope developed for this purpose utilized a rotating rectangular section of an off-axis parabolic mirror of 24-inch focal length.

BEHAVIORAL SCIENCES

Aero Medical Lab., Wright Air Development Center,
Wright-Patterson AFB, Ohio.
TRACKING PERFORMANCE AS A FUNCTION OF
FEEDBACK SPECIFICITY, by Darwin P. Hunt. Rept.
on Criteria for the Design and Arrangement of Dis-
plays. Mar 59, 39p. 8 refs. WADC Technical rept.
58-584; AD-212 311.
Order from OTS \$1.00 PB 161 070

The research reported herein was conducted to determine (a) the relationship between complex compensatory tracking and the specificity of displayed error, i.e., the number of categories of error information, and (b) the extent to which this relationship is influenced by task difficulty and amount of practice. Tracking error and control motion were the criterion measures. The results suggest that (a) linear increments in the number of categories of error information result in a negatively accelerated reduction in the tracking error; (b) as the operator becomes more proficient, the superiority of the greater number of categories is reduced; (c) the effects of the number of categories of information on control motion depends upon the difficulty of the task; and (d) although the amount of control motion generally decreases as the operator be-

comes more proficient, the magnitude of this decrease is greater for the "easy" task than for the "difficult" task.

School of Aviation Medicine, Randolph AFB, Tex.
CHANGES IN PLASMA CORTICOSTEROIDS AND BICARBONATE AS A RESULT OF PILOTING SUPER-SONIC AIRCRAFT, by Henry B. Hale, James P. Ellis and Clyde H. Kratochvil. Apr 59, 5p. 10 refs. Rept. 59-61.

Order from LC mi\$1.80, ph\$1.80 PB 143 742

While flying high-speed military aircraft, pilots frequently hyperventilate to a degree sufficient to induce marked alkalosis. Psychogenic factors are thought to be responsible for the hyperventilation. Comparison was made of pre- and postflight plasma bicarbonate (determined titrimetrically) and corticosteroid levels (Sweat's technic) for 20 instructor pilots and 47 student pilots flying F-100 aircraft for 50 minutes. No differentiation of students and instructors was possible on the basis of either pre- or postflight values; therefore, the data for the two groups were combined. The plasma bicarbonate value following the flight was $1.1 \pm .24$ mEq./liter (mean \pm S. E.) lower than before the flight. Free 17-hydroxycorticosterone was increased $5.8 \pm .70$ μ g./100 ml., while conjugated 17-hydroxycorticosterone increased $5.7 \pm .75$. The free corticosterone-like fraction increased $3.1 \pm .34$ μ g./100 ml., while the conjugated corticosterone-like fraction increased $3.2 \pm .35$. Each of these changes was significantly different from zero ($P < .001$). No statistically significant correlation was found between the fall in bicarbonate and any of the increases in steroid fractions.

Personnel and Training

Human Resources Research Office, George Washington U., Washington, D. C.
THE DEVELOPMENT OF JOB DESCRIPTIONS FOR NIKE AJAX BATTERY OFFICERS, by Charles L. Darby, William F. Brown and others. Rept. on [Contract DA 49-106-qm-1]. Apr 59, 81p. Technical rept. 54.

Order from LC mi\$4.80, ph\$13.80 PB 143 565

This study is the first stage of a research project designed to determine the level of skill and knowledge required of officers assigned to NIKE AJAX batteries, so that courses of instruction can be scientifically devised to train officers for maximum effectiveness. Job descriptions were developed for the positions of Battery Commander, Battery Executive Officer, Integrated Fire Control Platoon Leader, and Launcher Platoon Leader. Information was obtained from experienced battery officers, based on the job descriptions, through check-list responses indicating the training needs associated with selected activities. The activities judged most important for all four officer positions were: serving as battery control officer, insuring equipment readiness, and training and evaluating operators.

Institute of Personality Assessment and Research, U. of California, Berkeley.

THE USE OF TRAIT RATINGS IN AN ASSESSMENT OF 100 AIR FORCE CAPTAINS, by Donald G. Woodworth and Donald W. MacKinnon. Rept. on Contract AF 18(600)08. Sep 58, 44p. 17 refs. WADC-TN-58-64; AD-202 845.

Order from LC mi\$3.30, ph\$7.80 PB 143 386

As part of a project for developing officer assessment techniques, 30 rating dimensions were used by 10 raters to record their psychological evaluations of 100 captains. A cluster analysis of these ratings yielded three reliable cluster scores. Analyses indicated that the three cluster scores could be defined as measuring general effective intelligence, personal soundness and assessability, and effective leadership. The three cluster scores did not correlate significantly with available Air Force criterion evaluations of the subjects. When the subject officers were differentiated on the basis of being rated or nonrated, it was found that the correlations between cluster scores and two of the criteria rose to levels which were significant within the rated group. This was interpreted as an indication that differentiation on the criterion side of the relationship is needed for significant advancement toward an understanding of the Air Force officer personnel evaluation variables, or the relating of psychologically meaningful measures to these criteria.

Naval Personnel Research Field Activity, San Diego, Calif.

DEVELOPMENT AND STANDARDIZATION OF WOMEN'S MECHANICAL TEST FORM 6W, by Bernard Rimland and John H. Steinemann. Dec 58, 18p. 3 refs. BuPers Technical Bulletin 58-14.

Order from LC mi\$2.40, ph\$3.30 PB 143 254

MECH 6W represents an improvement over the previous test used for Waves in several respects. The raw score mean on the 100 item MECH 6W is 49, as compared with 36 on the previous test. Only four per cent of Waves tested fell below the chance level on MECH 6W as compared with 22 per cent on the previous test. The standard deviation has been raised from 8.11 to 10.94. The correlation between MECH 6W and the previous test is .80 for a sample of 300 Waves and .91 for a sample of 412 male recruits. (These coefficients are to some extent inflated by an overlap of items in the two tests, however). Adoption of MECH 6W for the testing of Wave recruits appears warranted.

Naval Personnel Research Field Activity, San Diego, Calif.

EFFECT OF EXTRANEIOUS NUMERICAL INFORMATION ON THE U. S. NAVY ARITHMETIC TEST, by Bernard Rimland. March 59, 17p. 5 refs. BuPers Technical Bulletin 59-4.

Order from LC mi\$2.40, ph\$3.30 PB 143 252

The subtests containing extraneous information tended to be less homogeneous (i. e., to have smaller variances, Kuder-Richardson reliabilities and smaller item-test correlation coefficients) than the subtests composed of the same items without extraneous information. The findings of this research do not support

the inclusion of extraneous information in arithmetic reasoning items if a relatively pure and homogeneous measure of arithmetic reasoning is desired, as is the case in the Navy Arithmetic Test.

Naval Personnel Research Field Activity, San Diego, Calif.

EFFECTS OF TIME LIMITS AND OF "RIGHT ANSWER NOT GIVEN" IN THE U. S. NAVY ARITHMETIC TEST, by Bernard Rimland. May 59, 18p. 6 refs. BuPers Technical Bulletin 59-5. Order from LC mi\$2. 40, ph\$3. 30 PB 143 253

The use of "right answer not given" as a possible response to the arithmetic reasoning items was not found superior to the use of five numerical choices. The use of "right answer not given" as a possible response increased the difficulty of the test to a slight (but statistically significant) extent. No evidence was found indicating that any combination of 10, 12 or 14 minute time-limits for the computation subtest and 30, 35 or 40 minute time-limits for the reasoning subtest was better than the original operational combination of 12 and 35 minutes. The insensitivity of the Arithmetic Test to reductions of about seven minutes consideration should be given to reducing the time limits, providing that later research shows this to be possible with no reduction in validity.

Naval Personnel Research Field Activity, Washington, D. C.

VALIDITY OF NON-COGNITIVE TESTS AT NUCLEAR POWER SCHOOL (SUBMARINE) by David Kipnis and Albert S. Glickman. May 59, 16p. 1 ref. BuPers Technical Bulletin 59-6. Order from LC mi\$2. 40, ph\$3. 30 PB 143 251

The results obtained with the experimental tests indicate that they may be valuable supplements to current cognitive predictors of NP school performance. If confirmed by additional research already in progress, two potential benefits are in prospect: (a) it will be possible to increase the accuracy of selection, improve quality of manpower input, and increase the level of performance in programs such as these; or (b) it will be possible to increase the pool of men capable of performing satisfactorily while maintaining the standards that are considered satisfactory at present.

Navy Experimental Diving Unit, Naval [Weapons Plant] Washington, D. C.

MECHANICAL RESPIRATOR TECHNIQUES IN THE EVALUATION OF SCUBA, by G. M. Janney and W. F. Searle, Jr. 30 June 58, 46p. Research rept. 6-58. Order from LC mi\$3. 30, ph\$7. 80 PB 139 171

A "mechanical respirator" has been and is currently used in research and evaluation projects at the Experimental Diving Unit to determine breathing resistance in breathing apparatus. The equipment and the procedure followed when using it are described. The accuracy and the usefulness of the data obtained through the use of the mechanical respirator are discussed.

Personnel Lab., Wright Air Development Center, Lackland AFB, Tex.

FEASIBILITY OF A METHOD FOR ESTIMATING SHORT-TERM AND LONG-TERM EFFECTS OF POLICY DECISIONS ON THE AIRMAN PERSONNEL SYSTEM, by John W. Merck and Frank B. Ford. June 59, 21p. 1 ref. WADC-TR-59-38; AD-217 079. Order from LC mi\$2. 70, ph\$4. 80 PB 143 689

This report describes and indicates the utility of a model which simulates the flow of airmen through the Air Force personnel system under a given set of policies. This model makes it possible to estimate, with as much accuracy as is available in the input information, the effects of that set of policies at future points in time. These effects may be gauged in terms of the future distribution of grade levels, career fields, or other pertinent information which may be built into the model.

Personnel Lab., Wright Air Development Center, Lackland AFB, Tex.

OCCUPATIONAL CLASSIFICATION IN SOME MAJOR GOVERNMENT AGENCIES, by Joseph E. Morsh and Forrest R. Ratliff. WADC-TN-59-37; AD-212 540. Order from LC mi\$4.80, ph\$13.80 PB 143 690

On the basis of information obtained during personal visits and conferences, current practices in occupational classification in some major military and civilian agencies of the Federal Government are reported. The following agencies are included: Department of the Air Force, Bureau of Naval Personnel in the Department of the Navy, the Adjutant General's Office in the Department of the Army, the Bureau of Labor Statistics and the Bureau of Employment Security in the Department of Labor, the Census Bureau in the Department of Commerce, and the United States Civil Service Commission. The prime purpose of the survey was to generate hypotheses for the furtherance of occupational classification research in the Air Force. In a concluding section of the report the present state-of-the-art of occupational classification is discussed and research implications are suggested.

Personnel Research and Development Corp., Cleveland, Ohio.

THE INFLUENCE OF RATING SCALE CONSTRUCTION UPON THE CHARACTERISTICS OF RATINGS RENDERED. Rept. on Contract Nonr-2221(00). Oct 58 136p. 5 refs. Order from LC mi\$6. 90, ph\$21. 30 PB 143 703

Four rating scale formats were used by the first and second line supervisors of four groups of clerical workers. The formats varied from unstructured to highly structured. The format incorporating trait titles and behavioral descriptions of scale steps demonstrated marked superiority over both more and less structured formats. This format demonstrated higher interrater reliability, less halo and less leniency than did the other formats. Variability was approximately equal for all formats. The study will be reported in four parts. Part I will report respective reliability, leniency, halo, and variability. Part II will be concerned with the characteristics of the eight scales as

they are influenced by the several formats. The comparisons of these self ratings with ratings made by superiors will be presented in Part III. To verify the results of the basic study, truncated versions of Formats I and III were used in two clerical and one manufacturing situation in industrial organizations. These results will be presented in Part IV.

School of Aviation Medicine, Randolph AFB, Tex.
THE PRESENT STATUS OF PHYSICAL FITNESS IN THE AIR FORCE, by Bruno Balke and Ray W. Ware. May 59, 10p. 8 refs. Rept. 59-67.
Order from LC mi\$1.80, ph\$1.80 PB 143 374

Work capacity, a sensitive and realistic measure of "physical fitness," was determined on more than 500 military and civilian Air Force personnel for the purpose of collecting material for the standardization of physical performance capacity. A treadmill test permitted an evaluation of results in physical as well as in physiologic terms. On the basis of results, physiologic considerations, and observations of men at various stages of physical training, an arbitrary rating scale of work capacity is suggested. According to this pilot study 42 percent of the test population had to be rated as "poor" and 40 percent as "fair." Only 18 percent could be considered as having a "good" or better physical condition. Sedentary living habits, more than aging or other factors, were apparently the main antagonists of good physical fitness.

Washington U., Seattle.
DIFFERENTIAL PREDICTION OF NAVAL SCIENCE AND APTITUDE GRADES AT THE UNIVERSITY OF WASHINGTON FROM BATTERIES OF FOUR-TEEN AND OF THREE VARIABLES, by Thomas D. F. Langen. Rept. on Predictor Selection Techniques, Contract Nonr-477(08). Oct 58, 95p. 41 refs.
Order from LC mi\$5.40, ph\$15.30 PB 143 714

The Washington Pre-College Differential Grade Prediction Battery is an effective instrument for the selection of Naval ROTC students for either the subsidized or the non-subsidized programs. It is slightly superior to either of the instruments now used by the Navy Department in selecting such students. The results of this exploratory study are such as to warrant further study on a larger scale.

Psychology

Aero Medical Lab., Wright Air Development Center, Wright-Patterson AFB, Ohio.
TRANSFER OF TRACKING PERFORMANCE AS A FUNCTION OF A DELAY BETWEEN THE CONTROL AND THE DISPLAY, by Marvin Levine. Rept. on Learning and Transfer in Reference to Training Aid Design, Contract AF 18(600)50. Nov 53, 33p. 13 refs. WADC Technical rept. 53-237.
Order from LC mi\$3.00, ph\$6.30 PB 138 912

Using a one-dimensional, compensatory tracking task, an investigation was made into the way tracking performance transfers as a function of changes in an expo-

ponential delay inserted between the operator's control and his display. The research was divided into two studies. The first investigated performance on a transfer task containing a 3.000 second exponential delay following training with delays of either .015, .150, .900, 2.100, or 3.000 seconds in the system. The second investigated performance on a transfer task containing a delay of .015 seconds following training with delays of either .015, .900, or 3.000 seconds in the system. The results show that (a) when operators transfer to the longest delay, training with any of the shorter delays is equally efficient; (b) when operators transfer to the shortest delay, training efficiency decreases with decreasing similarity of the training and transfer situations.

Applied Mathematics and Statistics Lab., Stanford U., Calif.

A LINEAR LEARNING MODEL FOR A CONTINUUM OF RESPONSES, by Patrick Suppes. Technical rept. no. 19 on Contract Nonr-255(17). 18 Oct 58, 29p.
Order from LC mi\$2.70, ph\$4.80 PB 143 018

The aim of the present investigation is to formulate and analyze a linear model for simple learning with a continuum of responses. The analogous model for a finite number of responses has been extensively studied both experimentally and mathematically.

Arizona State Coll., Tempe.
FIRST-ORDER CONDITIONING OF MEANING AND THE PARALLEL CONDITIONING OF A GSR, by Arthur W. Staats, Carolyn K. Staats, and Hugh L. Crawford. Technical rept. no. 6 on Psychological Processes in Language Communication, Contract Nonr-2305(00). Sep 58, 9p. 13 refs.
Order from LC mi\$1.80, ph\$1.80 PB 143 696

A GSR was conditioned to the word **LARGE**, as it was presented in a list of words to the **Ss**, using shock and noise as **UCS**. The word **BIG** was also presented at the end of the list to test for generalization of the conditioned GSR. Generalization did not occur. Subsequent to this conditioning procedure, the evaluative meaning of **LARGE**, and its synonym **BIG** were measured using an appropriate semantic differential scale. Negative evaluative meaning had been conditioned to **LARGE**. This meaning did not generalize to **BIG**. Thus, the same procedure which conditioned a GSR to a word also conditioned negative evaluative meaning to the word--but in neither case did the conditioned response generalize to a synonym word. It was found, in addition, that the intensity of the conditioned GSR was significantly correlated with the intensity of the conditioned meaning response. The results support the theory that word meaning consists of responses which are classically conditioned to a word through systematically pairing it with certain aspects of the environment. Alternative interpretations of the relationship of the GSR and meaning response were discussed. It was pointed out that further studies utilizing the methodology of the present experiment might shed light on the unanswered questions raised by the discussion. In general it was felt that the present procedure would be useful in establishing the principles of the learning of word meaning.

Arizona State Coll., Tempe.
MEANING AND (M): CORRELATED BUT
SEPARATE, by Arthur W. Staats and Carolyn K.
Staats. Technical rept. no. 7 on Psychological
Processes in Language Communication, Contract
Nonr-2305(00). Oct 58, 12p. 17 refs.
Order from LC mi\$2.40, ph\$3.30 PB 143 391

Two approaches to meaning were summarized and contrasted. Word meaning may be considered to be the verbal responses made to the word, or word meaning may be a conditioned response, part of the response elicited by the object denoted by the word. The present paper described the latter as meaning and distinguished word meaning from a word's verbal associates. The correlation between intensity of meaning and verbal associate measures which has been reported was seen to be a result of the artifact that the same operation strengthens both: the more often a word is paired with its associates the stronger the connections between them. In addition, the meaning of the associates is conditioned to the word. This view was supported by showing that the associates of a word have the same meaning as the word. The two approaches to meaning were discussed further and it was concluded that words could not gain meaning through verbal associations *per se*. Originally, it is through pairing words with systematic aspects of the environment that their meaning is gained. The meaning acquired in this process may later be conditioned to other words.

Army Ordnance Human Engineering Lab., Aberdeen
Proving Ground, Md.
THE MOTIVATIONAL EFFECTS OF REST PERIODS
ON PERFORMANCE, by Samuel A. Hicks. Aug 59,
21p. Technical memo. no. 8-59.
Order from LC mi\$2.70, ph\$4.80 PB 143 532

This study investigated the effects of different rest schedules on the performance of a heavy rotary task. The schedules used were: (1) Fixed Interval (FI) - rest after a given amount of time (2) Fixed Ratio (FR) - rest after a given number of responses. Forty enlisted men were used as subjects for this experiment. The results indicate that for the type of task under consideration here the FR schedule elicits greater total output than does the FI schedule. There are indications that this effect may be a direct result of the work load or physical strength of the operator. Variables requiring further investigation are cited in this report.

Colorado U., Boulder.
SOCIAL AND PERSONALITY FACTORS IN ATTITUDE CHANGE, by O. J. Harvey. Annual technical rept. on Contract Nonr-2149(02). Nov 58, 14p.
Order from LC mi\$2.40, ph\$3.30 PB 143 462

Connecticut Coll., New London.
CONFORMING BEHAVIOR AND PERSONALITY
VARIABLES, by Mortimer H. Applezweig and George Moeller. Technical rept. no. 8 on Contract Nonr-996(02). Apr 58, 25p. 25 refs.
Order from LC mi\$2.70, ph\$4.80 PB 138 603

Conforming behavior of 41 college freshman women, as measured in an Asch situation, was compared with 38 scales of the Edwards Personal Preference Schedule, the Gough California Psychological Inventory, and the Gordon Personal Profile. It was found that only the Abasement scale of the Edwards, and possibly the Sociability scale of the Gordon were able to generate significant relationships with a kind of behavior which should have been predictable from some 12 to perhaps 27 of the 38 measures used. Excepting the five scales of Gough's 18, on the basis of questionable comparability of samples, a total of 33 measures were correlated with conformity behavior. Only two were found to have construct validity for this type of social conformity criterion.

Educational Testing Service, Princeton, N. J.
EMPIRICAL TRIAL OF METHODS FOR ESTIMATING THE DISTRIBUTION OF TRUE SCORES, by Frederic M. Lord. Rept. on Contract Nonr-2214(00). Oct 58, 16p. 2 refs.
Order from LC mi\$2.40, ph\$3.30 PB 143 698

For each of two groups of examinees, the third and fourth moments of the distribution of true scores on a French achievement test are estimated by two different methods. One set of estimates results directly from the classical assumptions that the errors of measurement are distributed normally and independently of true score. The other set of estimates is obtained under the "item-sampling" model. A check is obtained on the item-sampling model by (a) applying it to the two groups separately, (b) applying it to the same groups combined. Pearson type-I curves are fitted to the estimated moments and the resulting estimated frequency distributions of true scores are drawn. The two methods of estimation are found to give almost the same results for the four-semester group, but somewhat different results for the eight-semester group. Theoretical considerations show that the two methods must give nearly the same results when a test is highly reliable. A manageable formula displaying the relation between the two methods of estimation in the case of the third true-score moment is presented.

Educational Testing Service, Princeton, N. J.
RESPONSE SET AS A MEASURE OF PERSONALITY, by Norman Frederiksen and Samuel Messick. Rept. on Contract Nonr-694(00). Feb 58, 34p. 36 refs. AD-156 771.
Order from LC mi\$3.00, ph\$6.30 PB 138 339

The present research was primarily oriented toward the use of response sets to measure stylistic consistencies revealed in test-taking behavior. The study was concerned with whether or not set scores could be obtained independently of content and with at least potentially useful reliability. Also investigated were the extent to which set and content scores obtained from different tests measure the same or different characteristics, and the extent to which set scores change with experimental conditions designed to modify set. The major findings were: (1) Reliable set scores can be obtained. (2) The three "criticalness" set scores were found to be substantially inter-correlated. (3) "Critical" instructions altered mean

criticalness set scores in the expected direction to an extent that is significant for one test, nearly significant for another test, and non-significant for the third test. (4) Although uncritical tendencies are correlated with acquiescence, the two response sets are not identical. (5) Content scores from the report-writing tests were found to be intercorrelated with each other, but low correlations were obtained between content and set scores. (6) Content scores were related to Mathematics Aptitude, Reasoning, and Vocabulary, but "criticalness" set was generally unrelated to ability. (7) Patterns of correlations with personality variables suggest the possibility of using different response sets to measure various personality consistencies.

Iowa State U. [Iowa City].
SENTENCE COMPLETIONS E: SUSCEPTIBILITY TO "SCORE FAKING", by Arthur L. Benton, Harold P. Beechtoldt, and Joan D. Kemble. Rept. on Research on Aptitude-for-Service Tests for Enlisted Personnel, Contract Nonr-311(11). 15 Apr 58, 5p. 1 ref.
Order from LC mi\$1.80, ph\$1.80 PB 138 841

Sentence Completions E consists of 20 incomplete sentences, each with three possible endings which the subject is required to rank in terms of the one that best describes how he thinks or feels, the one that least well describes how he thinks or feels, and the one that occupies an intermediate position in these respects. There are six possible response patterns associated with each ranked item. For each item there is one response pattern which was found on two independent samples both to be modal for enlisted men with records of successful naval service and also to discriminate significantly between these men and groups of men with records of unsuccessful naval service, as defined by discharges for reasons of personal inadequacy or delinquent conduct. The test is scored in terms of the number of these discriminating response patterns which appear in the total performance.

Louisiana State U., Baton Rouge.
GROUP EFFECTIVENESS, COERCION, CHANGE AND COALESCENCE AMONG DELINQUENTS COMPARED TO NON-DELINQUENTS, by Howard A. Bryant, D. A. Dobbins, and Bernard M. Bass. Technical rept. no. 15 on Behavior in Groups, Contract N7onr-356(09). Oct 58, 16p. 14 refs.
Order from LC mi\$2.40, ph\$3.30 PB 143 392

The hypothesis was tested that institutionalized delinquents are more susceptible to peer group influence than non-delinquent boys matched in intelligence and age. Three groups of 5 delinquents at each of 4 age levels: 14, 15, 16 and 17, were contrasted with 12 corresponding groups of boys from a small town public high school. Each member of each group privately ranked 5 cities according to their estimated size. A discussion followed in order to obtain a group decision. Then a final private decision was recorded by each member. Rank order correlations within and between members were the measures of agreement and accuracy used to test the hypothesis. Although non-delinquents were significantly more in agreement before and after discussion, delinquents increased

more in agreement as a consequence of discussion, although not significantly so. The hypothesis generally was supported that delinquents are more sensitive to the effects of interaction with their peers; they coalesce more (but not significantly according to parametric tests); they shift their opinions significantly more; they profit more in accuracy (but not significantly) and they are more coerced by their peers accepting the opinions of others more publicly than privately at all age levels examined. It would appear that delinquents, even more than non-delinquents, are likely to respond to suggestion to change, if the suggestions come from peers during discussion and if group decisions are permitted. The results are consistent with observations about the significance of the gang to the delinquent and suggest that changing attitudes and reeducating delinquents will be facilitated by judicious use of their own peer groups.

Louisiana State U., Baton Rouge
TEST OF A PROPOSED THEORY OF LEADERSHIP, by Bernard M. Bass. Annual rept. no. 4 on Behavior in Groups, Contract N7onr-356(09). 15 Nov 58, 6p. 12 refs.
Order from LC mi\$1.80, ph\$1.80 PB 143 422

Analyses of data based on an original experiment with 255 subjects have been finished. Attention has been focused on testing specific hypotheses drawn from a theory of leadership and group behavior. The theory itself, with a review of the literature, has been completed. New experiments and methodological examinations carried out. (See also PB 137 057)

Naval Retraining Command, San Diego, Calif.
INTERPERSONAL VARIABLES RELATED TO RECIDIVISM IN MILITARY DELINQUENCY, by Virginia Ives, Marguerite Q. Grant, and Kelley B. Ballard. Technical rept. no. 8 on Rehabilitation Research, Contract Nonr-1535(00). 15 Dec 57, 15p. 10 refs.
Order from LC mi\$2.40, ph\$3.30 PB 138 649

Ninety-one men confined for military disciplinary offenses were interviewed just prior to their restoration to regular duty. The interviews were tape-recorded and the recordings were rated twice independently on 430 rating items. Each of these items was correlated with a dichotomous success-failure criterion based upon a report of each man's duty status six months after restoration. Forty-seven items proved to be significantly related to restoration behavior. The majority of these items appear to be related to aspects of the man's level of interpersonal maturity. The present study is seen as preliminary and will be followed by a more detailed study on a larger sample.

Minnesota U., Minneapolis.
MISCELLANEOUS STUDIES IN WORD ASSOCIATION, by James J. Jenkins and Wallace A. Russell. Technical rept. no. 24 on The Role of Language in Behavior, Contract N8onr-662(16). [1958] 14p. 7 refs.
Order from LC mi\$2.40, ph\$3.30 PB 143 393

Personnel Lab., Wright Air Development Center,
Wright-Patterson AFB, Ohio.

**SOME STATISTICAL METHODS FOR DETECTION
OF NONSTANDARD TEST ADMINISTRATION**, by
Leland D. Brokaw. Jan 59, 36p. 11 refs. WADC-
TN-59-34; AD-210 475.

Order from LC mi\$3.00, ph\$6.30 PB 143 540

This paper reports the application of statistical techniques to the detection of fallacious values in test score distributions. Fallacious scores may appear from several sources, including cheating, improper procedures of test administration, or errors of scoring. Three techniques were chosen which are peculiarly appropriate to the task of detection of abnormalities of score distributions occasioned by the shifting of a group of scores from its proper place within the distribution: the sign test, the Kolmogorov-Smirnov test, and the significance of the difference between standard deviations. The techniques were applied to eight 100-case samples of basic airmen who had been tested and retested at Lackland Air Force Base on alternate forms of the Armed Forces Qualification Test. A control sample was selected, and the test scores from the other seven samples were altered to replicate conditions encountered operationally. The sign test proved more efficient than the other techniques, identifying six of the seven samples containing fallacious data. The other two techniques each identified four of the seven samples, but not the same four samples.

Psychological Labs., Carnegie Inst. of Tech.,
Pittsburgh, Pa.

**VARIABLES UNDERLYING SOCIOMETRIC STATUS.
III. CONFORMITY BEHAVIOR: A PSYCHOLOGICAL
REINTERPRETATION**, by E. P. Hollander. Technical
rept. on Contract Nonr-1849(00). Oct 58, 17p. 15 refs.
Order from LC mi\$2.40, ph\$3.30 PB 143 705

The central thesis developed is essentially as follows: an individual functions within a social field largely in terms of his perception of the "group expectancies" regarding his behavior. Depending upon his motivational and perceptual states, as they relate to certain features of the social field, he will be more or less given to behavior in keeping with these expectancies. Expectancies are not static but rather depend upon the outcome of past interaction between the individual and relevant others. A core element then is the historical or time-linked effects of interaction in determining the countervailing perceptions of the individual and these others.

Psychological Labs., Carnegie Inst. of Tech.,
Pittsburgh, Pa.

**VARIABLES UNDERLYING SOCIOMETRIC STATUS.
IV. SOME FURTHER FINDINGS ON LEADERSHIP,
FOLLOWERSHIP AND FRIENDSHIP**, by E. P.
Hollander. Technical rept. on Contract Nonr-
1849(00). Nov 58, 12p. 5 refs.
Order from LC mi\$2.40, ph\$3.30 PB 143 460

Using poor nomination data secured from graduating medical students at the University of Pittsburgh, an analysis was undertaken paralleling previous the analysis by Hollander and Webb of nominations on

leadership, followership, and friendship. Corroboration of these earlier findings was obtained. Some implications were seen regarding the differential evaluative base underlying these nominations.

Psychological Research Association, Inc.,
Arlington, Va.

**A REPORT ON RESEARCH CONCERNING A
METHOD FOR OPTIMIZING THE EFFICIENCY OF
TRAINING PROGRAMS**, by James F. Parker, Jr.
Annual rept. on Contract Nonr-2489(00). Dec 58, 14p.
1 ref.

Order from LC mi\$2.40, ph\$3.30 PB 143 617

This report is intended to describe the basic nature of the program and to indicate results which might be forthcoming. It is not designed as a definitive report on results obtained during a particular phase of the project.

Psychologisch Laboratorium van de Universiteit te
Nijmegen (Netherlands).

**THE PROCESS OF ASSIMILATION WITH STRANGERS
TO A NEW LIVING AND WORKING ENVIRONMENT.**
Annual Technical rept. no. 1, 1 Feb 58-1 Mar 59, on
Contract DA 91-508-EUC-285. Mar 59, 71p. 1 ref.
AD-213 233.

Order from LC mi\$4.50, ph\$12.30 PB 143 366

The investigation is carried in two separate parts (I and II). Investigation I refers to the process of assimilation with unmarried Italians, natives of Sardinia, who are employed as miners in the Dutch National Coal-mines. In this investigation 3 groups of 20 Italians are interviewed. Investigation II refers to the process of assimilation with 40 Indian-Dutch families who were expelled from their native country and settled in the Netherlands in the hope of building up a new existence. The present Report can only give an account of the results of phase I, investigation II.

Vanderbilt U., Nashville, Tenn.

AUTHORITARIANISM AND LEADER ACCEPTANCE,
by Edward P. Crockett (Master's thesis). Technical
rept. no. 5 on Contract Nonr-2149(02). Oct 58, 22p.
29 refs.

Order from LC mi\$2.70, ph\$4.80 PB 143 708

The relationship between authoritarianism and acceptance of formal leadership in established organizations was examined from the following standpoints: (a) Acceptance of formal leadership as a function of member authoritarianism. (b) Leader acceptance as a function of leader authoritarianism. (c) Leader acceptance as related to the degree of correspondence between authoritarianism in the leader's and follower's personalities.

Vanderbilt U., Nashville, Tenn.

**EXTRAPUNITIVENESS AND AUTHORITARIANISM:
CHANGES IN ATTITUDINAL CORRELATES AS A
RESULT OF FRUSTRATION**, by Jack M. Wright.
Technical rept. no. 7 on Contract Nonr-2149(02).
[1959] 26p. 17 refs.

Order from LC mi\$2.70, ph\$4.80 PB 143 710

The results of relating changes in professed attitudes of individuals (as a result of frustration) to extra-punitiveness, as measured by the P-F Study; and authoritarianism, as measured by the California F-scale, and relating these changes to one another, and summarized below. When frustrated by an authority figure, authoritarians increased (in a positive direction) their evaluations of peer group, authority figures, people in general, and self, more than did nonauthoritarians. Evidence was also found to the effect that authoritarians are more easily frustrated than are nonauthoritarians. Through the technique of partial correlation, evidence was found of a tendency on the part of authoritarians to suppress aggression toward a frustrating authority, necessitating an increased positive evaluation of self and others as a form of compensation. Lack of any significant correlations between the P-F Study and changes in the variables, or with the F-scale, is discussed as being the result of lack of consideration on the part of this instrument of certain factors of a social nature which aid in determining reactions to frustration.

Vanderbilt U., Nashville, Tenn.
RECIPROCAL INFLUENCE OF GROUP AND THREE TYPES OF LEADERS IN AN INSTRUCTED SITUATION, by O. J. Harvey. Technical rept. no. 4 on Contract Nonr-2149(02). Oct 58, 21p.
 Order from LC mi\$2. 70, ph\$4. 80 PB 143 706

The small groups studied were squads from an Army airborne division. From these, three different types of leaders were sociometrically determined. The formal leader was the official squad leader but not preferred as leader by the men. The informal leader was preferred by the men to be the squad leader but was not the official leader. The formal-informal leader was both the official squad leader and preferred by the men to be. The total number of subjects was 354, 285 experimental and 69 control. In comparison to the control groups, the leaders in all conditions conformed markedly to the judgments of the members despite the large differences in the leader and members' stimuli. Even in those conditions where leaders did depart from group judgments in their own evaluations, the influence on the group was almost nil. Significant differences occurred among the different leaders in the extent to which they were influenced by group judgments. Most conforming to the evaluations of other members of the group was the unpopular formal leader in the absolute, or more uncertain, condition. Possible implications of this for military leadership were indicated. Authoritarianism, group satisfaction and solidarity, and informal status in the group did not relate to influencibility. However, members' popularity in the squad did correlate significantly to their influence by the leader in the informal-absolute and informal-gradual conditions, the conditions in which the leader was the one preferred by the men to be their leader.

Vanderbilt U., Nashville, Tenn.
STATUS AND CONFORMITY TO PRESSURES OF INFORMAL GROUPS, by O. J. Harvey and Conrad Consalvi. Technical rept. no. 6 on Contract Nonr-2149(02). Oct 58, 16p. 10 refs.
 Order from LC mi\$2. 40, ph\$3. 30 PB 143 709

This study was concerned primarily with the differential conformity of the leader, second and lowest ranking member to pressures in the informal group. The informal groups were 27 cliques sociometrically selected from a training school for delinquent boys. The main finding of the study was that the second status member, the one only one step removed from the top, was significantly more conforming to judgments of the other members than was either the leader or lowest status man. The leader was least conforming but, due perhaps to smallness of the sample, not reliably less than the lowest status person.

Walter Reed Army Inst. of Research, Washington, D. C.
ASPECTS OF GROUP BEHAVIOR UNDER ATOMIC ATTACK, by Donald N. Michael. Aug 56, 16p.
 Management of Mass Casualties Publication no. 582.
 Order from LC mi\$2. 40, ph\$3. 30 PB 143 753

A lecture presented to the students of the course "Medical Care of Atomic Casualties" at Walter Reed Army Medical Center.

[Washington U., St. Louis, Mo. School of Medicine]
THE EFFECTS OF MASSED AND SPACED ELECTROCONVULSIVE SHOCK ON CONFLICT BEHAVIOR IN THE MALE ALBINO RAT, by G. J. Williams.
 Status rept. for June-31 Dec 57 on Contract Nonr-816(06). [1957] 7p. AD-203 078.
 Order from LC mi\$1. 80, ph\$1. 80 PB 138 205

See also PB 140 182

Washington U., Seattle.
THE GENERAL AND PRIMARY FACTORS IN STUDENT EVALUATION OF TEACHING ABILITY, by Thomas F. Hodgson. Rept. on Contract Nonr-477(08) and Public Health Research Grant M-743(C3). Oct 58, 101p. 15 refs.
 Order from LC mi\$5. 70, ph\$16. 80 PB 143 713

The following points are covered:
 Methodology
 Studies of the general factor model
 Definition of symbols
 Simple structure
 Orthogonal rotation
 Oblique rotation
 Extended vector analysis
 Final rotated matrix
 Analytic solutions
 Oblique transformation matrix H and primary factors
 Correlations among primary factors
 The general factor
 Augmented factor space, followed by
 Discussion

BIOLOGICAL SCIENCES

Arctic Aeromedical Lab., Ladd AFB, Alaska.
A SIMPLIFIED APPARATUS FOR THE PREPARATION