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A STUDY OF TEMPERAMENT AND OTHER ATTRIBUTES OF PERSONALITY
IN RELATION TO JOB ADJUSTMENT IN AN INDUSTRIAL SETTING

ROBERT DANIEL WEITZ

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in the
School of Education of New York University

1944

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CHAPTER I

INTRODUCTION

The scientific development of modern industry has been accompanied by marked increase in the use of job analysis and job specification as tools for matching man and job. Through the application of these techniques, the job analysts are able to furnish those, who are responsible for engaging industrial personnel, complete job pictures to facilitate the employment of qualified workers. Equally important, to understanding the job, is the understanding of the potential worker. This, too, has been realized through the development of psychometrics.

Students of industrial management have, for many years, recognized the relationships of intelligence, interests, manual coordination and dexterity - and other factors as well - to job adjustment; but only recently has it been more widely recognized that the general adjustment tendencies of the individual are highly important to job adjustment. Among the first to recognize this factor were Fisher and Hanna¹, who stated in this regard:

Much of the vocational maladjustment in American Industry is the result neither of intellectual deficiency, nor technical incompetency, nor objectionable factors inherent in the work itself, but rather of non-adjustive emotional tendencies within the individual which make a reasonable degree of harmony between him and most types of work impossible.

More recently, Tiffin², in treating the subject of individual differences in industry, stated:

Modern industry is becoming increasingly aware of the importance of placing on every job an individual who is not only

-
1. V. E. Fisher and J. V. Hanna, The Dissatisfied Worker, The MacMillan Company, New York, 1931. p. 1.
 2. Joseph Tiffin, Industrial Psychology, Prentice-Hall, Inc., New York, 1942. p. 1.

able to do the job well but who, in addition, is temperamentally adapted to the job in question.

The right man in the right job, then, is one goal toward which industry strives. It is in this spirit that this study is undertaken.

STATEMENT OF THE PROBLEM

The problem of this research is to determine the role which is played by the various aspects of the individual's personality make-up in orientation to the job. This is to be determined by both an empirical and correlational study of the relationships of temperament, home adjustment, health adjustment, social adjustment, emotional adjustment, intelligence and dexterity to adjustment in an unskilled assembly job. This job was chosen as it represents a simple, basic type of work, and is relatively free of the technical complications which a more skilled job would present.

PURPOSE OF THE STUDY

Job dissatisfaction and labor turnover are still commonly found among workers who ostensibly possess the necessary aptitudes for successful work. The cause of this, in all probability, is the fact that, generally speaking, management has neglected to allow for the personality differences which are common to man.

This study was undertaken for the purpose of gaining greater understanding of the relationships between the various personality attributes of the individual and job adjustment in order that man and job may be better matched in the industrial world. It is hoped that, through findings gained from this study, the way will be paved for further investigations based on more skilled types of occupations.

DELIMITATION OF THE STUDY

The study is limited to the following:

1. The subjects include 134 females between the ages of 18 and 45 years who are hired for unskilled assembly work by a large manufacturing concern in northern New Jersey.
2. It includes only those girls who meet the standards of physical fitness, intelligence and dexterity (finger and manual) as set by the company. These standards demark the minimum essentials for successful technical adjustment as determined by previous research within the company itself.
3. It will treat with only those behavior patterns which are measured by the Bell Adjustment Inventory and by the Humm-Wadsworth Temperament Scale.

DEFINITION OF TERMS AS USED IN THIS STUDY

1. Personality - This refers to the individual's constitutional make-up, including physique, intelligence, temperament and character. More specifically it sometimes refers to the adequacy of personal adjustments.³
2. Adjustment - This refers to the harmonious relationship which exists between the individual and any social situation.⁴
3. Temperament - This is limited to what is ordinarily called disposition - the individual's habitual behavior pattern.⁵ In this study

3. P. M. Symonds, Diagnosing Personality and Conduct, D. Appleton - Century Company, New York, 1931. pp. 560 - 561.

4. V. E. Fisher and J. V. Hanna, op. cit., pp. 19 - 20.

5. D. G. Humm and G. W. Wadsworth, The Humm-Wadsworth Scale, Manual of Directions, 1942 Rev. p. 1.

reference is made to the following temperament components.⁶

a. Normal (N) - This is characterized by such traits as self-control, self-improvement, and inhibition. Essentially this component is one of stabilization.

b. Hysteroid (H) - This is characterized by traits of self-concern, irresponsibility and domination. It is closely associated with criminal tendency.

c. Manic (M) - This is characterized by traits of sociability, elation, aggressiveness and enthusiasm. In its extreme form it is expressed by irritability.

d. Depressive (D) - This is characterized by traits of sadness, reduced activity, timidity, worry, and inability to concentrate.

e. Autistic (A) - This is characterized by traits of shyness, sensitivity, diversion of interest and heightened imagination as exemplified by day-dreaming.

f. Paranoid (P) - This is characterized by traits of suspiciousness, certainty of status, militant defense of ideas, self-sufficiency, and lack of sympathetic understanding for the opinions of others.

g. Epileptoid (E) - This is characterized by traits of meticulousness, dogged perseverance, ecstasy, periodic response to inspiration. The subject often spends lengthy periods in working out projects to their finality.

6. For more detailed description of the temperament components see Joseph Tiffin, op. cit., pp. 113 - 115; also Humm-Wadsworth, ibid., pp. 2 - 9.

SIGNIFICANCE OF THE PROBLEM

Labor turnover in industry is a costly process - both to the worker and to management.⁷ One important cause for this turnover is found in the mal-adjustment of the worker to the job. Among other things, the personality attributes of the individual play an important role in job adjustments; hence, it is important that we know more about these factors.

In 1940*, an estimated total of 10,780,000 persons were engaged in manufacturing establishments in the United States.⁸ Of that group a total of 4 1/3 million, or about 40%, had separated (quit, been discharged or laid off) from their jobs before the end of that year.⁹ That this estimated separation rate is conservative may be seen by comparing it with the estimates for previous years as shown in the following table:¹⁰

TABLE I

ANNUAL LABOR TURNOVER RATES (per 100 employees) IN ALL MANUFACTURING INDUSTRIES IN THE UNITED STATES: 1932 - 1940 INCLUSIVE:

Industry	1932	1933	1934	1935	1936	1937	1938	1939	1940
All Manu- facturing	51.98	45.38	49.17	42.74	40.35	53.11	49.22	37.71	40.27

7. Herbert Moore, Psychology for Business and Industry, McGraw-Hill Book Company, New York, 1939. p. 53.

* The year 1940 was selected by the writer, inasmuch as it just preceded the abnormal upward surge which the industries of the United States were soon to experience.

8. "Revised Estimates of Employees in Non-Agricultural Establishments in the United States, by Industry Division," Mimeographed report issued by Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C.

9. Handbook of Labor Statistics, Vol. I, U. S. Dept. of Labor, 1941 Edition, p. 533.

10. loc. cit.

The magnitude of the labor turnover problem may be more readily appreciated when it is considered that it costs industry on the average of \$45.00¹¹ per worker for the breaking in process. On this basis, then, the country is paying, conservatively, \$200,000,000 annually for replacing those who have separated from their jobs in the manufacturing industry.

Another aspect of the labor turnover problem, involving cost to management, has resulted from legislation in connection with unemployment compensation insurance. Employers, in many states, must now pay into the unemployment compensation insurance fund, an annual rate determined largely by the total claims filed against the company's account by workers separated from the firm during a set period. A high labor turnover rate is obviously unprofitable for the employer; hence selective placement becomes increasingly more important.

But the cost of labor turnover is only part of the total cost which the country must bear as a consequence of job maladjustment. More difficult to estimate, but definitely of consequence is the cost which results from the reduced efficiency of the maladjusted worker on the job.

While cost in dollars and cents is in itself an important factor, there is yet a more significant cost which the worker must pay as a consequence of job maladjustment: the unhappiness of job dissatisfaction. It has been contended by Hoppock that vocational maladjustment might well be

11. V. E. Fisher and J. V. Hanna, op. cit., pp. 234 - 235.

a cause of general emotional maladjustment in the individual.¹² This author¹³ stated:

Put an average person in a situation such that his family is dependent upon his performance in a job which demands a level of ability just beyond his reach, subject him to censure and ridicule for his failures, add worry over possible discharge; and the development of general emotional maladjustment would surprise very few psychologists.

Work and play - while perhaps, essentially different in motive - are often surprisingly alike insofar as the nature of the activity is concerned. It has been observed that frequently an individual's vocation and avocation are one and the same, or closely related activities; the tool-maker who works after hours cutting articles for his personal use and the personnel manager conducting bowling tournaments are classic examples of this fact.¹⁴ "Work in itself, then, is not merely a daily chore which man must discharge - it can be enjoyed. Unhappy is he who must fulfill certain activities every day - enjoy them or not - because social pressures demand it. Such is the difficulty of the maladjusted worker, whose job is work and work alone.

Industrial management has accepted the use of tests and measurements to improve the selection and placement of workers, but only "in a questioning mood."¹⁵ The true value of those instruments, in matching man and job, still must be proved; insofar as management is concerned, psychometric methods are still on trial.

12. Robert Hoppock, Job Satisfaction, Harper and Brothers, New York, 1935. p. 27.

13. loc. cit.

14. ibid., pp. 16 - 17.

15. Moore, op. cit., p. 53.

CHAPTER II

PREVIOUS RESEARCH IN RELATION TO THE PROBLEM

The use of psychological tests in general as instruments for judging job candidates, dates back to the year of 1910¹⁶, at which time industry called upon students of psychology to set up methods for selecting various types of employees. Among the first psychologists to become interested in testing for industrial selection, were Münsterberg¹⁷, Bingham¹⁸, Terman¹⁹, and Scott.²⁰

With the advent of the World War in 1917, great strides were made with respect to the use of psychological tests for job placement in the armed forces as millions of soldiers were subjected to test batteries prior to assignment.²¹

-
16. W. D. Scott, R. C. Clothier, S. B. Mathewson, W. R. Spriegel; Personnel Management, McGraw-Hill Book Company, New York, 1941. p. 150.
 17. H. Münsterberg, Psychology and Industrial Efficiency, Houghton-Mifflin Company, Boston, 1913.
 18. W. V. Bingham, "Applied Psychology at Carnegie Institute of Technology," Annual Report of the Director, Carnegie Institute of Technology, Vol. 14, 1917. pp. 53 - 60.
 19. L. M. Terman, "Tests for Policemen and Firemen," Journal of Applied Psychology, Mar. 1917.
 20. W. D. Scott, "Selection of Employees by Means of Quantitative Determination," Annals of the American Academy of Political and Social Science, May 1916.
 21. Committee on Classification of Personnel in the Army: "The Personnel System of the U. S. Army," Vol.1, History of the Personnel System, Chap. 43; Vol.2, The Personnel Manual, Chap. 12. Published by the War Department, Washington, D. C., 1919.

The relationships of intelligence, dexterity and other forms of aptitude to job adjustment have frequently been studied from various aspects.²² To date little has been done concerning the relationships of personality to job adjustment; primarily due to the fact that personality testing, per se, has been retarded by the inadequate development of measurement devices in this field. Some studies have been made, and they are presented below chronologically.

Prior to the development of personality tests, a few studies were made by subjective methods. In 1917, Adler²³ studied 100 cases of unemployed men, age 22 to 55, who were admitted as patients at the Boston Psychopathic Hospital. Of this group, he classified 43 as paranoid personalities, 35 as inadequate personalities (Lacking intelligence and judgment) and 22 as emotionally unstable. In this study Adler pointed out that, in the working population at large, we would not find a large proportion of severe emotional problems. He emphasized, however, that for every such case that was found, there would be numerous less severe cases of maladjustment.

In 1920, Jarrett²⁴ studied a group of workers from the standpoint of maladjustment. She, too, concluded that serious cases of maladjustment constitute a small, but potentially important, group of industrial workers.

22. Joseph Tiffin, *Industrial Psychology*, Prentice-Hall, Inc., New York, 1942. pp. 49 - 110.

23. Herman Adler, "Unemployment and Personality; A Study of Psychopathic Cases," *Mental Hygiene*, Vol. 1, Jan. 1917. pp. 16 - 24.

24. Mary C. Jarrett, "Report of Progress on Work Undertaken under the Engineering Foundation of New York," *Mental Hygiene*, Vol. 4, 1920. pp. 267.

She further concluded that, of the group studied, half had a form of mal-adjustment serious enough to require the services of a mental hygienist.

A study reported in 1923 by Stevens²⁵ revealed that of 4,000 store workers handled by the store's medical department over a six month period, 509 cases were diagnosed as "functional nervous disturbances."

During the years of 1924 and 1925, the National Institute of Industrial Psychology, in England, conducted a study for the purpose of improving the recruitment methods for engaging shorthand writers and typists for the British Civil Service Commission.²⁶ The members of the research committee concluded that "the shorthand writers and typists should in the future be engaged not only by the results of examinations, but also for their temperamental qualities assessed at a standardized interview by the use of a graphic rating scale."

In 1928, Brewer²⁷ analyzed the reasons for the discharge of 4,375 workers. He determined that 62% of the separations were due to "social shortcomings" rather than technical inadequacies.

One of the most significant of the subjective studies concerning personality and job adjustment was published in 1928 by Anderson.²⁸ He studied 1200 "run of the mine" employees of R. H. Macy & Company and found

25. H. W. Stevens, "The Psychic Aspect of Industrial Disability," Bulletin of the Massachusetts Department of Mental Diseases, Jan. 1923.

26. H. J. Welch and C. S. Meyers, Ten Years of Industrial Psychology, Isaac Pitman and Son, Ltd., London, 1932. p. 79.

27. J. M. Brewer, "Causes for Discharge," Personnel Journal, Vol. 6, Jan. 1928. p. 172.

28. V. V. Anderson, Psychiatry In Industry, Harper and Bros., New York, 1929. p. 46.

that 19 percent of the sales people and 23 percent of the non-sales force presented conditions important enough to be considered as employment risks to the store. "It is from this group", stated Anderson, "that are drawn the repeated transfers from job to job, or resignations, or lay-offs. These are the work failures that in the majority of cases are a drag on an organization."

Anderson²⁹ reported another study, in the same text, concerning "low cost" and "high cost" sales personnel. From this study he concluded that extraverts, or aggressive personalities, make the best sales people. He found, further, that the low cost sales group, in general, suffer fewer and less serious personality disorders.

In 1930, Spielman of the National Institute of Industrial Psychology demonstrated how significantly the value and reliability of the interview could be enhanced by the use of systematic procedures and rating scales.³⁰ It was pointed out that no successful psychological tests of temperament or character had yet been devised, and that "research was demanded in this direction."

In the text, by Fisher and Hanna³¹, which appeared in 1931, reference is made to an unpublished study by Dr. Anna Y. Reed; concerning maladjustment in school as related to maladjustment in the earlier years of

29. ibid., p. 235

30. Welch and Meyers, op. cit., p. 41.

31. V. E. Fisher and J. V. Hanna, The Dissatisfied Worker, The MacMillan Company, New York, 1931. pp. 229 - 230.

industrial experience. From this investigation Dr. Reed noted that a high correlation existed between maladjustments in school and maladjustments in industry. This fact led Dr. Reed to conclude that such maladjustments are carried over from the home and school to industry. She further indicated that the maladjustments are deep-seated in the personalities of the individuals and are not "the reflection of temporary and fleeting attitudes."

Hersey³², in 1932, conducted an investigation dealing with normal workers of various ages, occupations, personality types and nationalities. He studied their overt behavior - as represented by efficiency, lateness, cooperativeness, verbal outbursts, constructive ideas, and absenteeism - emotional behavior, dominant trends in thought and revery and physiological factors in terms of their relationships with environmental conditions and personality traits. Hersey collected his data by means of personal interviews, with each subject, four times a day - at work and at home. He measured the emotional state of the individual by what he termed, "a common sense interpretation of feeling tone." This was, in brief, the agreement between the subject and the observer as to the individual's emotional state at the designated time.

Hersey concluded that workers in a positive emotional state (happy, elated, etc.) are more productive than those in a negative state (unpleasant, suspicious, angry, etc.). He further concluded that productivity is subject to variation as influenced by the personality of the worker and environmental working conditions.

32. R. B. Hersey, "Rate of Production and Emotional State," Personnel Journal, Vol. 10, Feb. 1932. pp. 355 - 364.

The results of one of the earliest objective investigations of the relationships between personality and work adjustment were published in 1932 by McMurray.³³ He studied the relationships between the objective scores on "a typical test of neurotic tendency," the Bernreuter Personality Inventory, and the efficiency and work satisfaction of 196 employees of a large Chicago bank. McMurray found, from his study, that the neurotic tendency scores correlated but slightly with efficiency ratings; the correlations which were manifest were in the direction of a relationship between neurotic tendency and lowered efficiency. His results further indicated that the Bernreuter scores appeared to bear no relationships to age, length of service and absences. According to McMurray's findings, the Personality Inventory scores showed a slight but consistent relationship to work attitudes; the subjects scoring in the most neurotic quarter of the distribution showed a slight tendency toward job dissatisfaction, more monotony, irritability and fatigue than did the other three quarters of the group. The intelligence test scores (Otis) of the group were found to have correlations varying from .34 to .57 with efficiency ratings. Finally, McMurray determined that little advantage was gained by using the Bernreuter test as a supplement to the Otis test for discriminating the efficient from the inefficient subjects.

Mayo³⁴, in 1933, published some of the results of the Hawthorne Western Electric experiment regarding job adjustment. He stated that,

33. Robert N. McMurray, "Efficiency, Work Satisfaction and Neurotic Tendency," Personnel Journal, Vol. 11, Dec. 1932. pp. 201 - 210.

34. Elton Mayo, The Human Problems of an Industrial Civilization, The MacMillan Company, New York, 1933. p. 116.

through personal interviews with the workers, it was concluded that the locus of industrial maladjustment was found to be in the person - work - company relationships rather than in any single individual or individuals.

A study of the relationships of the abilities, attitudes and social histories of 15 sewing machine operators was conducted by Grauer³⁵ in 1934. He used tests, interviews, supervisor's ratings, wage records and case histories as the sources of his data.

Among his conclusions, Grauer indicated that hourly earnings proved to be the most objective criterion of work adjustment. He stated, further, that it appeared that unfavorable test attitudes were associated with inferior abilities, poor work adjustment and feelings of inferiority which were expressed in "resentfulness and emotional outbursts during the test." The estimates of work adjustment based on records of earnings were found, by this investigator, to bear close agreement with the estimates of job success as adjudged by supervisor's ratings.

The year of 1935 proved to be exceedingly fruitful insofar as studies of personality as related to job adjustment are concerned; four important studies appeared in that year.

Wadsworth³⁶ conducted a study of the adjustment of employees who were selected for their jobs by test procedures in comparison with a group placed by the same company without being subjected to the tests. He found

35. David Grauer, "Abilities, Attitudes and Success," Personnel Journal, Vol. 12, Apr. 1934. pp. 328 - 333.

36. Guy W. Wadsworth, "Tests Prove Their Worth to a Utility," Personnel Journal, Vol. 14, 1935. pp. 183 - 187.

that the 61.5% of the test-selected group proved to be satisfactory workers as opposed to 49% of the non-test group; that 53% of the test group proved to be outstanding in comparison with 22% of the other group, and, finally, that only 5.5% of the test-selected workers proved to be "problem" employees as compared to 29% of the non-test group.

Hanna³⁷ investigated the problem of job stability and earning power of the emotionally maladjusted worker as compared with the emotionally adjusted worker. He dealt with a heterogeneous group of 250 subjects, age 16 to 40. The emotional stability of the individual was evaluated on the basis of scores made on the Thurstone Personality Schedule.

From this investigation, Hanna determined that the job stability of the adjusted individual is greater than that of the maladjusted person. In addition, he concluded that the average wage difference between the groups was to be traced to the personality differences among the workers.

Schultz³⁸ carried on a study based on the selection of salesmen by psychological tests. He concluded from this study that tests of personality showed the best results in selecting good salesmen.

Through questionnaire and interview, Hunt³⁹ carried out an investigation as to the causes of discharge and deficiencies preventing promotions among the clerical staffs of a number of large and well-known business firms.

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37. Joseph V. Hanna, "Job Stability And Earning Power of Emotionally Mal-adjusted As Compared With Emotionally Adjusted Workers," Journal of Abnormal and Social Psychology, Vol. 30, No. 2, 1935. pp. 155 - 163.
38. Richard D. Schultz, "Test Selected Salesmen Are Successful," Personnel Journal, Vol. 14, Oct. 1935. p. 140.
39. H. C. Hunt, "Why People Lose Their Jobs or Aren't Promoted," Personnel Journal, Vol. 14, Dec. 1935. p. 227.

He determined that the lack of specific skills accounted for 10.1 percent of the workers who were discharged; whereas 76.5 percent were dismissed from their jobs because of faulty character traits. The lack of specific skills prevented promotion in 23.5 percent of the subjects, while undesirable character traits interfered with promotion in 76.5 percent of the cases studied.

In 1938, Goldstein⁴⁰ analyzed the causes of dismissal for 3000 workers who were discharged over a period of time, from a large company. He found that 62.4 percent of these cases had been dismissed due to personality maladjustments rather than lack of skill or training.

In the same year Dodge⁴¹ reported his study of the relationships between social dominance and sales success. He found that scores of social dominance correlated highly with success of individuals comprising a new group of sales personnel.

One of the earliest studies of personality, based on the Humm-Wadsworth Temperament Scale, was conducted by Hemsath⁴² in 1939. That investigator studied 700 subjects who were engaged in various clerical capacities in a large bank. She concluded from her investigation that individuals who manifest abnormal trait patterns are not the best employees.

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40. Hyman Goldstein, "In Again - Out Again," Industrial Arts and Vocational Education, Vol. 27, No. 1, Oct. 1938. p. 320.
41. Arthur Dodge, "Social Dominance and Sales Personality," Journal of Applied Psychology, Vol. 22, 1938. pp. 132 - 139.
42. Mary E. Hemsath, "Theory and Practice of Temperament Testing," Personnel Journal, Vol. 18, May 1939. pp. 3 - 12.

Summarizing her findings regarding the Humm-Wadsworth Scale, Hemsath⁴³ said:

The results we obtain from the Humm-wadsworth Temperament Scale come uncannily near the truth when they are properly handled and interpreted. It certainly weeds out possible trouble-makers from otherwise acceptable employees. It is a quick and sure method compared with the wait-and-see-what-happens approach.

Schultz⁴⁴ reported, in 1940, the results of a study which he carried out in connection with the placement of several hundred men in an aircraft industry. These men were assigned to jobs on the basis of their test results; which included, among other things, a test of personality traits. He found that the ratings made on the preliminary employment tests showed high agreement with the subsequent job performance ratings given by foremen in the shops.

In 1941, Hampton⁴⁵ published his findings concerning the relationship of personality traits to success in selling. His conclusions indicated that "personality tests as the Bernreuter may be used to advantage in vocational selection and guidance."

In 1942, Tiffin⁴⁶ summarized a few of the Humm and Wadsworth follow-up studies regarding the validity of their temperament scale. He stated:

43. loc. cit.

44. Richard S. Schultz, "Personnel Selection in the Aviation Industry," Personnel Journal, Vol. 19, Sept. 1940. pp. 93 - 105.

45. Peter Hampton, "A Comparative Study of Certain Personality Traits and Success in Retail Selling," (M.A. Thesis - University of Manchester) Journal of Applied Psychology, Vol. 25, No. 4, Aug. 1941. pp. 431-446.

46. Joseph Tiffin, Industrial Psychology, Prentice-Hall, Inc., New York, 1942. p. 116.

One of these investigations has involved the extensive testing of applicants at the Lockheed Aircraft Corporation, Burbank, California. In this organization the policy has been to reject applicants for employment whose scales reveal "weak Normal;" Hysteroid or Paranoid scores higher than "Normal;" Manic scores, Depressive scores, and Autistic scores that were extremely high or higher than "Normal;" and high Epileptoid scores accompanied by physiological evidences of epilepsy. The results of this hiring policy in terms of employee turnover has been quite satisfactory. Out of 185 engineering employees, 184 met these standards and one was accepted as doubtful. Of these employees, the doubtful case and one other were discharged later for reasons arising out of temperamental maladjustments. The other 183 employees were found to be entirely satisfactory from the personality viewpoint. Of 1500 other employees engaged for work in tool designing, welding, sheet metal assembly, machine shop, and precision assembly, at the time of the report only 18 had been discharged for reasons arising out of temperamental maladjustment. Transferred into percentages, this would mean that 98.8 percent of the employees selected according to this policy were satisfactory from the temperamental point of view - - - Evidence of this type indicates that this scale at least partially reveals at the time of employment whether an applicant has a temperamental make-up that is likely to make him unsuitable as an employee.

In the same year Irwin⁴⁷ reported similar findings in connection with the Lockheed testing program. He pointed out that less than two out of three new employees developed into satisfactory workers; many quit or were terminated. He estimated that the cause of 80 percent of the employee misfits was due to temperamental maladjustment.

Again, in 1942, Kirkpatrick⁴⁸ reported his conclusions with respect to the factor of boredom as related to the job. "Susceptibility to

47. I. Randall Irwin, "Lockheeds Full Testing Program," Personnel Journal, Vol. 21, Sept. 1942. pp. 103 - 106. See also - "Testing Applicants - and the Worth of It at Lockheed," Trained Men, Vol. 22, Sept.-Oct. 1942. pp. 3 - 10.

48. Forrest H. Kirkpatrick, "Human Engineering Applied - A Valuable Asset," Trained Men, Vol. 22, Nov.-Dec. 1942.

boredom," he stated, "appears to depend upon intelligence, partly upon temperament, and probably involves a 'total personality set'."

Lastly, in 1942, Wrenn⁴⁹ reported his study of "dominance" as related to occupational choice and advancement. He found that "dominance" scores tend to increase with a rise in occupational status level. He also observed that individuals, who aspired to higher work levels, showed progressively higher "dominance" scores.

One series of studies, closely related to this research problem has been neglected to this point: deliberate faking of test results. These studies have been grouped and are presented as follows:

Kelly, Miles and Terman⁵⁰ studied the ability of both male and female subjects to influence their own scores on a paper-and-pencil test of personality: the Stanford Masculinity-Femininity Test. The major conclusion which resulted from this investigation was that "subjects of both sexes are able to shift their scores enormously either in the masculine or feminine direction as a result of instructions to do so."

Traxler⁵¹ observed that it is difficult to use tests, which ask the subject how he feels or what he does, for employment purposes; since the individual applying for a position is naturally anxious to make a favorable impression. He observed that it was possible to influence the scores on the

49. Harold A. Wrenn, "The Drives of Workers," Personnel Journal, Vol. 20. p. 320.

50. T. L. Kelly, C. C. Miles, and L. M. Terman, "Ability to Influence One's Score On A Typical Paper-and-Pencil Test of Personality," Character and Personality, Vol. 14, No. 3, Mar. 1936. pp. 206 - 215.

51. A. E. Traxler, "The Use of Tests and Rating Devices in the Appraisal of Personality," Educational Records Bulletin, No. 23. Mar. 1938. pp.10-11.

Bernreuter Personality Schedule by instructing the subjects to mark the test items in such a way that they will get desirable scores.

Burt⁵², too, has pointed out that personality tests, such as the Bernreuter Personality Schedule, the Humm-Wadsworth Temperament Scale and the Pressey X-0 Test, have been used, to date, in the employment field with some misgiving. This he attributed to the fact that the job applicant is prone to answer the test in a manner favorable to himself, rather than with complete truthfulness. Burt mentioned one particular instance in which a test score was altered. He stated⁵³:

In this particular case it was desirable to secure salesmen who "knew their way around," that is, who had some contact with socially questionable things and could meet the prospects on almost any level. Consequently, an information test was devised that included items about poker, crap-shooting, chorus girls, and the like, for the purpose of finding out whether the prospective salesmen actually were familiar with such matters. The intention was to hire those who did show this familiarity. However, a group of applicants who took the test suspected that the results were going to be interpreted in just the opposite fashion; hence, practically no one in the group knew the difference between a "full house" and a "flush" or were acquainted with "Little Joe." The test completely misfired.

Tiffin⁵⁴ reported a study, conducted with 65 college students, by W. J. Giese and F. C. Christy, at Purdue University, on the extent to which the Humm-Wadsworth Scale (1940 Revision) component scores may shift when the subject is changed from a clinical situation to a job application situation.

52. H. E. Burt, Principles of Employment Psychology, Harper and Bros., New York, Rev. 1942. pp. 111 - 113.

53. loc. cit.

54. Tiffin, op. cit. p. 117.

"In this study each student was given the scale twice: first, with instructions to be as frank as possible, and second, to assume that he was in an employment office after a job and had been asked to take the test as a part of the test procedure."

That the component scores are readily subject to change, depending upon the nature of the situation may be seen in the following table⁵⁵:

TABLE II

MEAN SCORES ON HUMM-WADSWORTH TEMPERAMENT SCALE OBTAINED
IN A CLINICAL AND AN EMPLOYMENT SITUATION BY 65 COLLEGE STUDENTS.*

<u>Component</u>	<u>Clinical Mean</u>	<u>Employment Mean</u>	<u>Shift from Clinical to Employment</u>
Normal	981	1023	+ 42
Hysteroid	1023	980	- 63
Manic	1035	937	- 98
Depressive	1061	913	-148
Autistic	1024	938	- 86
Paranoid	970	955	- 15
Epileptoid	983	1002	+ 19

Recognizing the limitations of the questionnaire type of test in general and of their own Temperament Scale in particular, as published in 1940, Humm and Wadsworth continued to develop methods for improving the validity of this test. These improvements were included in their 1942 revision of the scale.

55. loc. cit.

* These scores were computed by the log method, with correction for "no-count" as described in the 1940 revision of the manual of directions.

In its present form, either or both methods - the "Profile Score"⁵⁶ or the "Regression Score" - may be used to compensate for the subject's tendency to mask his true temperament. The scale, as presently used, eliminates first of all - by the "no-count method" - those tests which show too great suggestibility or defensiveness. Those tests which are acceptable on the basis of the "no-count", are treated further by the "Profile Method" or the "Regression Method" to compensate for the size of the "no-count."

The Humm-Wadsworth Temperament Scale, as revised in 1942, appears to be a more valid instrument than were the earlier forms of this scale. The methods for overcoming deception on the part of the subject appear to make the scale a more valuable tool for employment purposes. Whether or not this is true will be clarified, it is hoped, by this investigation.

56. For complete discussion of the "Profile Score" and "Regression Scores" see Humm-Wadsworth, Temperament Test, Manual of Directions, 1942 Rev. pp. 11 - 13.

CHAPTER III

THE PROCEDURE USED IN COLLECTING, ANALYZING AND EVALUATING THE DATA

THE SUBJECTS

To control the effect which difference in sex might impose on the problem of personality in relation to job adjustment, only females were included as subjects for the study. It was required, furthermore, that the group fulfill the company's job specification for the position: assembler of radio units. To qualify for this job it was necessary that the individual be between eighteen and forty-five years of age, and meet the company's minimum standards of health, intelligence and dexterity.

Initially, 212 applicants were interviewed and examined for the job. Only 134, however, successfully met the job specifications and were accepted by the company. It was this group which constituted the subjects of the research.

THE MEASUREMENT INSTRUMENTS

Intelligence and Mechanical Aptitude Tests

Three standard aptitude tests were used in examining the subjects: the Otis Self-Administering Test of Mental Ability (Intermediate Examination; Form A), the O'Conner Finger Dexterity Test, and the Minnesota Rate of Manipulation Test. These test results were used as the basis for selection mainly because they were already part of the company's standard hiring procedure; in addition they proved - through prior research on the part of the company - to be satisfactory instruments for testing potential assemblers.

Contrary to the popular concept of the nature of intelligence tests, the Otis examination was referred to above as an aptitude test. This concept, expounded by Bingham⁵⁷, is based on the premise that intelligence tests are standardized tasks to measure resourcefulness, or aptitude, for solving problems.

Otis Self-Administering Test of Mental Ability

This is a verbal test of mental ability developed in four equivalent forms for grades four to nine (Intermediate Examination) and for high school students and college freshman (Higher Examination). In this study the Intermediate Examination, Form A, was used, as most of the job applicants - from the company's past experience - fell within the fourth to ninth grade limits.

The Otis Test consists of seventy-five questions to which the subject responds by placing the answer in the parenthesis which follows the question. Some of the typical questions are:

Which one of the five things below does not belong with the others?

1 potato 2 turnip 3 carrot 4 stove 5 onion.....()

Which word means the opposite of sorrow?

1 sickness 2 health 3 good 4 joy 5 pride.....()

One number is wrong in the following series. What should the number be?

3 4 5 4 3 4 5 4 3 5.....()

An uncle is to an aunt as a son is to a (?)

1 brother 2 daughter 3 sister 4 father 5 girl.....()

57. W. V. Bingham, Aptitudes and Aptitude Testing, Harper and Brothers, New York, 1937. pp. 34 - 59.

This test requires thirty minutes to administer and it is easily scored. The raw scores may be converted into mental age equivalents and intelligence quotients by means of tables which are furnished in the test manual. In this study only the raw scores were used.

The Otis test has been found to be highly reliable. On equivalent forms of the test the author found reliability coefficients of .953 for 215 cases and .943 for 212 cases.⁵⁸

O'Connor Finger Dexterity Test

This test is a performance test of finger dexterity wherein the subject is required to fill a 100 - hole pegboard by picking up three pins at a time from a shallow tray and placing these pins together in the holes. This test as originally described by Hines and O'Connor⁵⁹ required the use of a formula for scoring; however, since that time Tiffin and Greenly⁶⁰ have found that simple time scores could be used, as these scores correlated .99 with the scores determined by the O'Connor formula.

In this study the subjects were timed for the first fifty holes rather than for the complete board. This method was used to reduce the time for administering the complete test series. That the procedure was sound is seen in the reliability coefficient of .98 which Tiffin and Greenly⁶¹ obtained by correlating the first half against the second half of the test.

58. Arthur S. Otis, Otis Self-Administering Tests of Mental Ability, Manual of Directions and Key, World Book Company, New York. 1928 Rev. p. 12.

59. M. Hines and J. O'Connor, "A Measure of Finger Dexterity," Personnel Journal, Vol. 4, 1926 pp. 379 - 382.

60. Joseph Tiffin and R. J. Greenly, "Employee Selection Tests for Electrical Fixture Assemblers and Radio Assemblers," Journal of Applied Psychology, Vol. 23, 1939. pp. 240 - 263.

61. Loc. cit.

As for the validity of the O'Connor Finger Dexterity Test, Tiffin and Greenly reported correlations of .22 and .33 between finger dexterity and productivity (indicated by earnings) and general efficiency (indicated by merit ratings) respectively. In discussing these correlations, Tiffin⁶² stated, "Although these coefficients are not as high as might be desired, the statistical chances are ninety-eight out of one hundred that even the lower one represents a real relationship between the test scores and production."

Minnesota Rate of Manipulation Test

This instrument is a performance test of mechanical aptitude which is now widely used by industry for pre-employment selection. There are two parts to the test procedure: Part I - Placing - which measures "the probable speed at which an individual can do things with his hands," and Part II - Turning - which measures "speed in doing things with the fingers."⁶³

The complete test consists of a board containing sixty circular holes and sixty circular blocks which fit readily into these holes. The blocks are of different colors on each face.

In the placing test, the subject is instructed to place the blocks into the holes of the board according to a definite plan which is given orally to the subject by the examiner. The score for the test is determined on the basis of the accumulated time for four trials following a practice trial.

62. Joseph A. Tiffin, Industrial Psychology, Prentice-Hall, Inc., New York. 1942. p. 87.

63. W. A. Zeigler, Minnesota Rate of Manipulation Test, Manual of Directions, Educational Test Bureau, Inc., Minneapolis. 1933. p. 2.

In the turning test, the subject is instructed to turn the blocks over one at a time according to a definite plan given orally by the examiner. Here too, the score is figured on the basis of four trials following one practical.

As to the reliability and validity of this test, Zeigler⁶⁴ claimed significant findings. He stated,

Although it takes only about twenty minutes to give the tests, the scores have unusually high degree of reliability. The probable error for the placing test is only 2.8 seconds in comparison with the mean score of 233 seconds, and for the turning test the probable error is only 2.7 seconds in comparison with the mean score of 192 seconds. In each case, the probable error is less than one-eighth of the standard deviation for adult workers. The probable error of the percent placements is 1.75. The probable error means that the chances are even that the score which any individual makes will not be wrong by more than 2.8 seconds for the placing test or 2.7 seconds for the turning test or 1.75% in either test in terms of percent placements. The high reliability which these small probable errors indicate will be manifest by referring to the tables. It means that in repeated trials, the chances are even that an individual's score will not vary more than three seconds or more than 1.75% of the difference between the poorest and the best individual among a representative one thousand.

The validity of the tests is also very high. Amongst the 2000 cases from which the standards for these tests were established, there were a number of factory workers whose duties required speed of manipulation in routine tasks. The high scores in the top quarter of the range of scores were made by fast workers having high production records.

With respect to the practical application of the Minnesota Rate of Manipulation Test to industrial selection, Cook and Barre⁶⁵ have found it "to be a very useful instrument for jobs requiring manipulative skill."

64. Loc. cit.

65. David W. Cook and M. F. Barre, "The Effect Of Specialized Industrial Norms On The Use Of The Minnesota Rate of Manipulation Test As A Selective Instrument In Employment Procedure," The Journal of Applied Psychology, Vol. 26, No. 6. Dec. 1942.

Personality Tests

Two tests of the questionnaire type were used for the measurement of personality: The Bell Adjustment Inventory and the Humm-Wadsworth Temperament Scale.

The Bell Adjustment Inventory

The Bell Adjustment Inventory consists of 160 questions to which the subject responds by encircling either a "yes", "no" or "?". Some of the typical questions included in the inventory are as follows:

- | | | | |
|-----|----|---|---|
| Yes | No | ? | Do you have ups and downs in mood without apparent cause? |
| Yes | No | ? | Do you feel self-conscious when you have to ask an employer for work? |
| Yes | No | ? | Do the persons with whom you now live understand you and sympathize with you? |
| Yes | No | ? | Do you frequently experience nausea or vomiting or diarrhea? |
| Yes | No | ? | Does your present job force you to hurry a great deal? |

From the responses to the questions, raw scores are obtained which indicate the subject's Home, Health, Social, Emotional and Occupational adjustment. The raw score for each category is determined by counting the significant responses. A stencil which facilitates the scoring process is provided by the test publishers.

In this study, only the Home, Health, Social and Emotional adjustment categories were used; the Occupational adjustment score was disregarded due to the fact that most of the group had either never worked before or were returning to the labor market after being out of work for many years.

The reliability of the Adjustment Inventory was established by Bell for each section of the test by correlation of the odd and even items. He determined the following coefficients:

a. Home Adjustment - - - - -	.91
b. Health Adjustment - - - - -	.81
c. Social Adjustment - - - - -	.88
d. Emotional Adjustment - - - - -	.91

Bell⁶⁶ used two methods to validate the Inventory. First, he selected items which differentiated between the upper and lower fifteen percent of the individuals in a distribution of adult scores, and included only those items which clearly differentiated between these extreme groups. Secondly, he determined the extent to which the inventory differentiated between "very well" and "very poorly" adjusted groups as determined by specialists in adult counseling. In comparing the two groups he found marked differences in their average scores with critical ratios (determined by the formula:

$$CR = \frac{\text{Diff.}}{\text{Sigma of Diff.}} \text{) well above three.}$$

The Adjustment Inventory is readily administered and scored. The subject is usually able to complete the items in one-half hour or less. The scoring procedure averages about five minutes per test with the use of a scoring stencil.

The Bell Adjustment Inventory has not been widely used by industry, therefore little is known about its practical application. Moore⁶⁷, however, had some experience with it and stated, "The limited experience that I have had with it seems to indicate that it has considerable value."

66. Hugh M. Bell, The Adjustment Inventory, Manual of Directions, Stanford University Press, 1938. pp. 3 - 4.

67. Herbert Moore, Psychology for Business and Industry; McGraw-Hill Book Company, New York, 1939. p. 431.

The Humm-Wadsworth Temperament Scale

The Humm-Wadsworth Temperament Scale is one of the newer scales in the field of personality. It is of the questionnaire type and consists of 317 questions to which the subject responds by underlining the word "yes" or "no". Some of the typical questions are:

Do you like to meet people and make new friends?	Yes	No
When someone expresses an ignorant belief, do you try to correct him?	Yes	No
Have you ever suffered from periodic vomiting?	Yes	No
Does it make you nervous to have to wait?	Yes	No
Do you like to belong to lodges and clubs?	Yes	No

From the subject's responses, a profile is set up indicating the relative strength of the seven temperament components, which, according to the Kosanoff theory⁶⁸, make up the individual's general temperament configuration. The individual components are: Normal, Hysteroid, Manic, Depressive, Autistic, Paranoid and Epileptoid.⁶⁹

Raw scores are computed from the subject's responses. From these scores a profile is set up either directly or through the transposition of the raw scores to "profile scores" or "regression" scores. In this study the "profile" score technique was employed.

68. Aaron J. Rosanoff, Manual of Psychiatry, John Wiley and Sons, Inc., New York, 1927. p. 467.

69. For fuller discussion of the temperament components see the Humm-Wadsworth Temperament Scale, Manual of Directions, Rev. 1942. pp.3-9.

One of the chief objections that might be raised to this instrument is the length of time which is involved in filling out the responses; even rapid readers spend an hour or more in answering the questions. Insofar as the overall picture is concerned, the lengthy procedure is compensated for by the fact that the "fakers" are discovered by what the author terms the "no-count" method; this procedure must necessarily involve a large number of questions.

The validity of the Humm-Wadsworth Scale obtained by the authors from correlation of the test scores with case studies was found to be .98 when the invalid tests were eliminated. When the invalid tests were included the validity coefficient was reduced to .85.

The reliability of the scale was ascertained by the split-half method for each component. The coefficients obtained are as follows:

Normal	- - - - -	.82
Hysteroid	- - - - -	.85
Manic	- - - - -	.73
Depressive	- - - - -	.88
Autistic	- - - - -	.88
Paranoid	- - - - -	.70
Epileptoid	- - - - -	.75

The reports which have been published, to date, concerning the value of the scale to industrial selection, have generally been favorable.

Hemsath⁷⁰, for example, stated:

The results obtained from the Humm-Wadsworth Temperament Scale came uncannily near the truth when properly handled and interpreted. It certainly weeds out the possible trouble makers from the otherwise acceptable employees.

70. Mary E. Hemsath, "Theory and Practice of Temperament Testing," Personnel Journal, Vol. 18, May 1939. p. 12.

Criteria Of Job Effectiveness

Two criteria of job effectiveness were selected to evaluate the relative success of the subjects on the job: The Scott Graphic Rating Scale and the company production records. In addition, exit interviews were given to the subjects who terminated the job before the rating and production evaluations were due. The data on these "quit" cases were not included in the body of this report but are included in the appendix.

The Scott Graphic Rating Scale

This rating scale was selected as it appeared that it would provide a clear picture of the individual at work. With this instrument a graphic evaluation of the following attributes was secured:

- a. The ease with which the individual learns new methods and follows directions.
- b. The quantity of the work done and the promptness with which it is completed.
- c. The general quality of work.
- d. The industriousness of the individual.
- e. The degree of initiative shown on the job.
- f. The degree of success in working with others.
- g. The individual's knowledge of the job and related work.

The rater checks a point on each line of the scale representing the attributes listed above. By means of a scoring stencil, a raw score is derived for the scale as a whole. Both the rating and the scoring can be completed in less than five minutes for each individual scale.

The Graphic Rating Scale has been found to be reliable. In a study by Paterson⁷¹, average correlations of .76 and .87 were found for the ratings of nine foremen who individually rated the same subjects on three different occasions. These correlations represent the average consistency of each foreman's scores between the first and second ratings and their second and third ratings respectively.

Production Record

The actual production records made by the subjects were used as the second criterion of job effectiveness. The records were transposed into scores determined on the basis of the subject's average (Computed to the nearest integer) hourly production of material units, that passed inspection standards, for their last forty hours - five days - on the job at the close of the experimental period.

The production records are, probably, the most obvious and satisfactory of the job effectiveness criteria. Burt⁷² stated, "It is the thing which management is ultimately interested in predicting and is probably the best indication of a man's ability on the job."

METHOD OF THE RESEARCH

Two hundred and twelve female job-applicants, ages eighteen to forty-five inclusive, who applied for the position of assembler (a light manufacturing job requiring no previous training) were subjected to the

71. For more complete discussion of The Scott Company Graphic Rating Scale: Donald G. Paterson; Journal of Personnel Research, 1922-23, Vol. 1. pp. 361 - 376.

72. H. E. Burt, Principals of Employment Psychology, Harper and Bros., New York, Rev. 1942. p. 173.

Otis Self-Administering Tests of Mental Ability, Intermediate Examination; Form A, the O'Connor Finger Dexterity Test and the Minnesota Rate of Manipulation Test. Those of the group who satisfactorily met the company's standards* for the tests were given a physical examination and, upon medical approval, were employed. In all, of the original 212 job-applicants, only 134 qualified and were hired for the job.

Before reporting to their work shop, this group was further investigated by the Humm-Wadsworth Temperament Scale and the Bell Adjustment Inventory. Upon completion of these tests, they were assigned their individual stations.

Still further reduction in the number of subjects was necessitated through the elimination of those who produced invalid scores** on the Humm-Wadsworth Scale. Twenty were eliminated on this count; thereby reducing the total number of subjects to 114.

Those eliminated from the study because of invalid Humm-Wadsworth Scales were permitted to work along with the others, as the working conditions in this department were to differ in no way from similar departments in the plant. None of the group was informed at any time that they served

* The standards were as follows:

Otis Self-Administering Test of Mental Ability, Intermediate Examination; Form A: Minimum raw score - 15. This score is equivalent to an M. A. of nine years on the test scale.

O'Connor Finger Dexterity Test: Maximum time limit - 143 seconds for fifty holes. This score falls at the upper limit of the fourth quartile of the O'Connor test standardization group.

Minnesota Rate of Manipulation Test: Part I (Placing): Maximum time limit - 235 seconds. Part II (Turning): Maximum time limit - 230 seconds. The Placing score falls at approximately the fiftieth percentile of the test standardization group, whereas the Turning score is found at approximately the twenty-fifth percentile.

** The Humm-Wadsworth Scale is considered as invalid if the subject's "no-count" score (Negative responses) is less than 111 or greater than 221.

as subjects of the study; not even their immediate superiors were informed of the experiment until their ratings of the subject's job efficiency were due.*

No further check-up was made of the group, with the exception of exit interviews, for the subjects who terminated the job, until the four month experimental work period had elapsed. At that time each subject was rated by means of the Scott Graphic Rating Scale and scored for production on the basis of her material output record.

PRESENTATION AND TREATMENT OF THE DATA

The first step in the treatment of the data was the determination of the zero order intercorrelations, for the seventeen test variables** included in the study, by the Pearson Product-Moment Method. The formula used was:

$$r = \frac{N \sum xy' - \sum x' \cdot \sum y'}{\sqrt{N \sum x'^2 - (\sum x')^2} \sqrt{N \sum y'^2 - (\sum y')^2}}$$

* The ratings were made by the group's supervisor and an assistant sub-foreman of the department. They were informed of the study only two days prior to the due date for the ratings. Both men had previous experience in rating techniques and therefore required little additional training other than a two hour discussion of the Scott Graphic Rating Scale. Each subject's final rating score consisted of the average of the two individual ratings.

** The seventeen test variables and their numerical designations are as follows:

- | | |
|---------------------------------|--------------------------------------|
| 1. Intelligence | 10. Hysteroid temperament component |
| 2. Finger dexterity | 11. Manic temperament component |
| 3. Rate of manipulation-placing | 12. Depressive temperament component |
| 4. Rate of manipulation-turning | 13. Autistic temperament component |
| 5. Home adjustment | 14. Paranoid temperament component |
| 6. Health adjustment | 15. Epileptoid temperament component |
| 7. Social adjustment | 16. Job efficiency rating |
| 8. Emotional adjustment | 17. Production record |
| 9. Normal temperament component | |

Next, to eliminate spurious relationships in the data, partial correlations to the fourth order were determined between the personality components and the two criteria of job effectiveness: the graphic ratings and production scores. The following factors were held constant:

- a. Intelligence
- b. Finger dexterity
- c. Rate of manipulation - placing
- d. Rate of manipulation - turning

The formula⁷³ used for this procedure was:

$$r_{12.34\dots n} = \frac{r_{12.34\dots(n-1)} - [r_{1n.34\dots(n-1)}][r_{2n.34\dots(n-1)}]}{\sqrt{[1 - r_{1n.34\dots(n-1)}^2][1 - r_{2n.34\dots(n-1)}^2]}}$$

Specifically, the partial correlations were determined as follows:

The Bell Adjustment and the Humm-Wadsworth test scores were correlated with the rating scores while the other variables were held constant accordingly:

First order correlations

- a. Intelligence test scores
- b. Finger dexterity test scores
- c. Placement test scores
- d. Turning test scores

Second order correlations

- a. Intelligence and finger dexterity test scores
- b. Intelligence and placement test scores
- c. Intelligence and turning test scores

Third order correlations

- a. Intelligence, finger dexterity and placement test scores
- b. Intelligence, finger dexterity and turning test scores

Fourth order correlations

- a. Intelligence, finger dexterity, placement and turning test scores.

73. For discussion of this formula see: Herbert Sorenson, Statistics For Students Of Psychology and Education, McGraw-Hill Book Company, Inc., New York, 1936. p. 257.

The Bell Adjustment and the Humm-Wadsworth test scores were then correlated with the production scores while the other variables were held constant as outlined above.

Next, the test results of the two groups - represented by the subjects (N = 102) who remained on the job during the experimental period (Group I) and those (N = 12) who quit (Group II) - were analyzed and compared to determine what differences were indicated. The procedure for the analysis was as follows:

Distribution tables were organized for both groups for each of the personality components included in the study. From the distributions, the mean score for each component was determined. The mean was used as the measure of central tendency, rather than the median or the mode, because of its higher reliability and its value in determining other statistical data.⁷⁴

For Group I, the formula used was:

$$M = M' + \frac{(\sum fd')x}{N}$$

For Group II, the formula used was:

$$M = M' + \frac{\sum r'}{N}$$

The standard deviations for both groups were then determined by the formulas:

For Group I:

$$G = \frac{x}{N} \sqrt{N \sum fd'^2 - (\sum fd')^2}$$

74. ibid., p. 87

For Group II:

$$\sigma = \frac{1}{N} \sqrt{N \sum y'^2 - (\sum y')^2}$$

The standard errors were then determined for each mean value by the formulas:⁷⁵

For Group I

$$\sigma_M = \frac{\sigma_{SAMPLE}}{\sqrt{N}}$$

For Group II

$$\sigma_M = \frac{\sigma_{SAMPLE}}{\sqrt{N-1}}$$

The differences between the mean scores for each personality component of both groups were then determined. The significance of these differences was evaluated in terms of the critical ratio by the formula:

$$CR = \frac{M_1 - M_2}{\sigma_{(M_1 - M_2)}}$$

Finally, the Bell Adjustment Inventory and the Humm-Wadsworth test data were evaluated by qualitative analysis to ascertain the nature of the personality factors which were found to characterize the respective levels of job success. The procedure for the analysis was:

First, the rating results were studied to determine the number and the percentage of subjects who were rated above and below the mean score on the Scott scale. Next, the number of subjects who manifested strong temperament components - plus one or higher on the Humm-Wadsworth profile⁷⁶ - was

75. ibid., pp. 297 - 303

76. For discussion of the Humm-Wadsworth Temperament Scale profile see: Manual of Directions, 1942 Rev., pp. 14 - 18.

determined. Each component was then studied to find out the number and percent of the cases who fell above and below the mean score on the Scott Graphic Rating Scale. The percentages of the subjects who manifested strong components were then compared with those for the group as a whole to determine what differences existed between the groups on the rating scale distributions.

The same procedure was then repeated excepting that the production score distribution replaced the rating scale as the variable in question.

Both parts of the above procedure were again repeated; this time, however, the Bell Adjustment Inventory results replaced the Humm-Wadsworth scale in the analysis.

The results of the above analyses are reported in Chapter IV.

An analysis was also made of the drop out group distributions on the Humm-Wadsworth Scale and Bell Adjustment Inventory. These distributions were then compared with those of the experimental group. The findings of this analysis are reported in the appendix.

CHAPTER IV

RESULTS OF THE INVESTIGATION

In this chapter are presented the results: (a) of the administration of the various measuring devices, and (b) the statistical treatment of the data.

DESCRIPTION OF THE GROUPS EMPLOYED

The data obtained from the administration of the various tests are presented in Table III on page 41. The following factors are indicated:

Group I

Intelligence:

The average score made by the group is 50.98 or 51. This score falls at the twenty-fifth percentile for ninth grade students and indicates low-normal intelligence.⁷⁷

Finger Dexterity:

The average finger dexterity score for the group is 206 seconds on the basis of the 100 hole test norms. This score falls at the seventy-sixth percentile in comparison with an unselected group of 1272 persons, mostly females, who applied for assembly work at the plant.

Rate of Manipulation (Placing):

The average placing test score is 202 seconds. In terms of the norms reported for the test by its author, this score falls at the ninetieth percentile of an unselected group of 5000 males and females. When compared to the norms for the placing test established at the plant by 2007 unselected women, the score ranks at the sixty-third percentile.

77. Arthur S. Otis, Self Administering Tests of Mental Ability, Manual of Directions, 1928. p. 9.

TABLE III

THE AVERAGE SCORES MADE ON THE VARIOUS TESTS
BY THE SUBJECTS WHO REMAINED ON THE JOB FOR THE
FOUR MONTH EXPERIMENTAL PERIOD (GROUP I),
AND THOSE WHO QUIT (GROUP II).

<u>Test</u>	<u>Component Measured</u>	<u>Mean Score Group I*</u>	<u>Mean Score Group II**</u>
Otis Intermediate; Form A	Intelligence	50.98 ±1.34***	55.33 ± 3.81
O'Connor Finger Dexterity	Finger Dexterity	206.03 ±2.29	210.67 ±6.17
Minnesota Rate of Manipulation	Placing	202.06 ±1.25	206.83 ±3.67
	Turning	157.45 ±1.41	165.08 ± 3.49
Bell Adjustment Inventory	Home	4.76 ± .44	7.50 ± 2.46
	Health	2.80 ± .24	4.08 ± .96
	Social	12.51 ± .58	11.92 ±2.31
	Emotional	7.43 ± .50	9.83 ± 1.61
Humm-Wadsworth Temperament Scale	Normal	940.93 ±7.43	947.42 ±19.10
	Hysteroid	992.90 ± 7.29	959.58 ±21.54
	Manic	980.88 ±6.49	1006.08 ±24.93
	Depressive	992.15 ± 8.42	1018.58 ±27.69
	Autistic	1005.64 ± 6.49	1024.83 ±18.90
	Paranoid	993.38 ± 8.71	1002.67 ± 30.97
	Epileptoid	1040.69 ±8.91	1031.91 ±19.68

Rate of Manipulation (Turning):

The average turning test score is 157 seconds. On the basis of the author's norms, this score ranks at the ninety-second percentile of an unselected group of males and females. When compared with the industrial norms for the test established at the plant by 2475 unselected females, the score falls at the sixty-sixth percentile.

Adjustment:

The average scores made by the group with respect to the Home, Social and Emotional Adjustment factors are common to the average made by the test standardization group. The average Health score manifest by the subjects falls above the average standardization group score.

Temperament:

The average temperament components obtained from the Humm-Wadsworth Scale are essentially the same as were found by the authors⁷⁸ in their study of 1264 employed workers, except in one instance - the Normal component. In this investigation, the average Normal component is one profile - interval lower than was determined in the Humm-Wadsworth study.

The intervals at which the average scores of the experimental group fall on the temperament profile are as follows:

Normal component	-	borderline
Hysteroid component	-	moderately weak
Manic component	-	moderately strong
Depressive component	-	borderline
Autistic component	-	moderately weak
Paranoid component	-	borderline
Epileptoid component	-	moderately weak

78. Doncaster G. Humm and Guy W. Wadsworth, The Interpretation of The Humm-Wadsworth Temperament Scale, Privately Printed, Los Angeles, 1943. pp. 10 - 13.

Group II

The average scores made on the various tests by the twelve cases, which comprise this group, are essentially the same as are found in Group I. This may be seen in Table III. The differences that do appear are not real differences, since in no case is the critical ratio of the differences equal to 3.00 or higher.* These findings are pointed out in Table IV which appears on page 44. The highest critical ratio obtained is 2.03, and, in most cases, it is less than 1.00. Therefore, it can be inferred that the two groups are similar in the traits measured.

Inasmuch as Group II was composed of the cases which did not remain on the job for the entire experimental period, no job ratings and production scores were obtained for them. For that reason, the other findings related to Group II will be reported in the appendix.

RELATIONSHIPS OF THE VARIABLES

The interrelationships obtained, from the application of the Pearson Product-Moment Method of correlation to the seventeen variables included in this study, are found in Table V on page 45.

RELATIONSHIPS BETWEEN THE TEST FACTORS

In general the coefficients of correlation between the test factors are low and unreliable;** many do not exceed their respective standard errors which are reported in Table VI, page 46.

* For this study a critical ratio of 3.00 or higher is required for a significant difference.

** To be significant the coefficient of correlation must be at least three times its standard error.

TABLE IV

A COMPARISON OF THE AVERAGE SCORES MADE
ON THE VARIOUS TESTS BY GROUPS I AND II

Component	M_1^*	M_2^{**}	$M_1 - M_2$	$S.D_1$	$S.D_2$	$\frac{S.D.1}{-S.D_2}$	σ_{M_1}	σ_{M_2}	$\frac{\sigma_{M_1}}{-\sigma_{M_2}}$	C R.
Otis Intelligence	50.98 ± 1.34	55.33 ± 3.81	-4.35	13.55	12.60	.95	1.34	3.81	-2.47	1.08
Bell Home Adj.	4.76 $\pm .44$	7.50 ± 2.46	-2.74	4.47	8.17	-3.70	.44	2.46	-2.42	1.10
Bell Health Adj.	2.80 $\pm .24$	4.08 $\pm .96$	-1.28	2.41	3.17	-.76	.24	.96	-.72	1.30
Bell Social Adj.	12.51 $\pm .58$	11.92 ± 2.31	.59	5.82	7.67	-1.85	.58	2.31	-1.73	.25
Bell Emotional Adj.	7.43 $\pm .50$	9.83 ± 1.61	-2.40	5.09	5.33	-.24	.50	1.61	-1.11	1.42
Finger Dexterity	206.03 ± 2.29	210.67 ± 6.17	-4.64	23.13	20.50	2.63	2.29	6.17	-3.88	.71
Minnesota Placement	202.06 ± 1.25	206.83 ± 3.67	-4.77	12.59	12.17	.42	1.25	3.67	-2.43	1.23
Minnesota Turning	157.45 ± 1.41	165.08 ± 3.49	-7.63	14.24	11.58	2.66	1.41	3.49	-2.08	2.03
H-W Normal	940.93 ± 7.43	947.42 ± 19.10	-6.49	75.09	63.42	11.67	7.43	19.10	-11.67	.31
H-W Hysteroid	992.90 ± 7.29	959.58 ± 21.54	33.32	73.65	71.50	2.15	7.29	21.54	-14.25	1.47
H-W Manic	980.88 ± 6.49	1006.08 ± 24.93	-25.20	65.58	82.75	-17.17	6.49	24.93	-18.44	.98
H-W Depressive	992.15 ± 8.42	1018.58 ± 27.69	-26.43	85.08	91.92	-6.84	8.42	27.69	-19.27	.98
H-W Autistic	1005.64 ± 6.49	1024.83 ± 18.90	-19.19	65.51	62.75	2.76	6.49	18.90	12.41	.96
H-W Paranoid	993.38 ± 8.71	1002.67 ± 30.97	-9.29	88.02	102.83	-14.81	8.71	30.97	-22.26	.29
H-W Epileptoid	1040.69 ± 8.91	1031.91 ± 19.68	8.78	89.98	65.33	24.65	8.91	19.68	-10.97	.41

*1 - Still at work after 4 month period. N = 102

**2 - Left work prior to end of 4 month period N = 12

TABLE V

THE ZERO ORDER INTERCORRELATIONS FOR THE SEVENTEEN
VARIABLES AS DETERMINED BY THE PEARSON PRODUCT-MOMENT
METHOD FOR GROUP I

Variable No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	X	-.12	.01	.02	.31	.12	-.08	-.03	.22	-.06	.21	.08	-.03	.02	-.63	-.08	.02
2	-.12	X	.38	.33	-.13	-.10	.09	.00	-.06	-.07	-.04	.03	-.10	-.06	.04	-.19	-.14
3	.01	.38	X	.59	-.01	-.05	.03	-.02	-.07	-.19	.07	-.01	-.04	-.10	-.16	-.17	-.07
4	.02	.33	.59	X	-.07	-.10	.03	-.05	.03	-.26	-.08	-.02	.09	-.12	.03	-.19	-.14
5	.31	-.13	-.01	-.07	X	.33	.19	.40	-.10	.04	.17	.29	.00	.25	-.03	.06	-.01
6	.12	-.10	-.05	-.10	.33	X	.02	.35	-.10	.12	.29	.18	.00	.08	-.03	-.02	.03
7	-.08	.09	.03	.03	.19	.02	X	.59	-.23	-.11	.34	.36	.57	.17	.19	.24	.11
8	-.03	.00	-.02	-.05	.40	.35	.59	X	-.31	.03	.38	.64	.38	.27	.02	.05	.04
9	.22	-.06	-.07	.03	-.10	-.10	-.23	-.31	X	-.24	-.29	-.41	-.21	-.61	-.34	.19	.14
10	-.06	-.07	-.19	-.26	.04	.12	-.11	.03	-.24	X	.07	.05	-.10	.37	.02	-.26	-.22
11	.21	-.04	.07	-.08	.17	.29	.34	.38	-.29	.07	X	.76	.30	.15	-.09	.00	-.01
12	.08	.03	-.01	-.02	.29	.18	.36	.64	.41	.05	.76	X	.44	.11	.08	-.13	-.07
13	-.03	-.10	-.04	.09	.00	.00	.57	.38	-.21	-.10	.30	.44	X	.13	-.04	-.04	-.07
14	.02	-.06	-.10	-.12	.25	.08	.17	.27	-.61	.37	.15	.11	.13	X	.13	-.31	-.12
15	-.63	.04	-.16	.03	-.03	-.03	.19	.02	-.34	.02	-.09	.08	-.04	.13	X	.00	-.09
16	-.08	-.19	-.17	-.19	.06	-.02	.24	.05	.19	-.26	.00	-.13	-.04	-.31	.00	X	.75
17	.02	-.14	-.07	-.14	-.01	.03	.11	.04	.14	-.22	-.01	-.07	-.07	-.12	-.09	.75	X

KEY

- | | |
|---------------------------------|---------------------------|
| 1. Intelligence | 9. Normal component |
| 2. Finger dexterity | 10. Hysteroid component |
| 3. Manual dexterity (placement) | 11. Manic component |
| 4. Manual dexterity (turning) | 12. Depressive component |
| 5. Home adjustment | 13. Autistic component |
| 6. Health adjustment | 14. Paranoid component |
| 7. Social adjustment | 15. Epileptoid component |
| 8. Emotional adjustment | 16. Job efficiency rating |
| | 17. Production score |

TABLE VI

THE STANDARD ERRORS OF THE ZERO ORDER INTERCORRELATIONS
OF THE SEVENTEEN VARIABLES* FOR GROUP I

Variable No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	X	.098	.099	.099	.089	.098	.098	.099	.094	.099	.095	.098	.099	.099	.060	.098	.095
2	.098	X	.085	.088	.097	.098	.098	.099	.099	.099	.099	.099	.098	.099	.099	.095	.097
3	.099	.085	X	.065	.099	.099	.099	.099	.099	.095	.099	.099	.099	.098	.096	.096	.095
4	.099	.088	.065	X	.099	.098	.099	.099	.099	.092	.098	.099	.098	.098	.099	.095	.097
5	.089	.097	.099	.099	X	.088	.095	.083	.098	.099	.096	.091	.099	.085	.099	.099	.095
6	.098	.098	.099	.098	.088	X	.099	.087	.098	.098	.091	.096	.099	.098	.099	.099	.095
7	.098	.098	.099	.099	.095	.099	X	.065	.094	.098	.088	.086	.067	.096	.095	.093	.098
8	.099	.099	.099	.099	.083	.087	.065	X	.089	.099	.085	.058	.085	.092	.099	.099	.095
9	.094	.099	.099	.099	.098	.098	.094	.089	X	.093	.091	.082	.095	.062	.088	.095	.097
10	.099	.099	.095	.092	.099	.098	.098	.099	.093	X	.099	.099	.098	.085	.099	.092	.094
11	.095	.099	.099	.098	.096	.091	.088	.085	.091	.099	X	.042	.090	.097	.098	.099	.095
12	.098	.099	.099	.099	.091	.096	.086	.058	.082	.099	.042	X	.080	.098	.098	.097	.095
13	.099	.098	.099	.098	.099	.099	.067	.085	.095	.098	.090	.080	X	.097	.099	.099	.095
14	.099	.099	.098	.098	.098	.098	.096	.092	.062	.085	.097	.098	.097	X	.097	.089	.098
15	.060	.099	.096	.099	.099	.099	.095	.099	.088	.099	.098	.098	.099	.097	X	.099	.098
16	.098	.095	.096	.095	.099	.099	.093	.099	.095	.092	.099	.097	.099	.089	.099	X	.043
17	.099	.097	.099	.097	.099	.099	.098	.099	.097	.094	.099	.099	.099	.098	.098	.043	X

* For key, see Table V

For the intelligence factor the significant relationships that were obtained are:

Intelligence and Home Adjustment* - - - - - $r = .31 \pm .089$

Intelligence and Epileptoid Component - - - - - $r = -.63 \pm .060$

From these relationships, it may be inferred: (1) that there is a tendency for the more intelligent subjects to be less well adjusted to their home environments, and (2) that those with high Epileptoid temperament components manifest lower intelligence.

One further relationship involving intelligence must be noted, even though its coefficient is not high enough to be significant: intelligence and the Normal component ($r = .22 \pm .094$). This relationship indicates that there is at least a positive tendency for those of higher intelligence to be better self-composed.

For the mechanical aptitude factors the significant relationships obtained are:

Finger dexterity and placement - - - - - $r = .38 \pm .085$

Finger dexterity and turning - - - - - $r = .33 \pm .088$

Placement and turning - - - - - $r = .59 \pm .065$

Obviously there is a common relationship among these factors; yet the correlations are low enough to indicate that on the whole these tests measure different functions.

For the adjustment factors the significant relationships obtained are:

Home adjustment and Intelligence - - - - - $r = .31 \pm .089$

Home adjustment and Health adjustment - - - $r = .33 \pm .088$

* For the Home, Health and Emotional Adjustment factors of the Bell Inventory, low scores connote excellence in adjustment and vice versa. For the Social adjustment factor low scores denote aggressive personality and high scores retiring personality.

Home adjustment and Emotional adjustment - - - - -	r = .40 ± .083
Home adjustment and Depressive component - - - - -	r = .29 ± .091
Home adjustment and Paranoid component - - - - -	r = .25 ± .085
Health adjustment and Emotional adjustment - - - - -	r = .35 ± .087
Health adjustment and Manic component - - - - -	r = .29 ± .091
Emotional adjustment and Social adjustment - - - - -	r = .59 ± .065
Emotional adjustment and Normal component - - - - -	r = -.31 ± .089
Emotional adjustment and Manic component - - - - -	r = .38 ± .085
Emotional adjustment and Depressive component - - - - -	r = .64 ± .058
Emotional adjustment and Autistic component - - - - -	r = .38 ± .085
Emotional adjustment and Paranoid component - - - - -	r = .27 ± .092
Social adjustment and Manic component - - - - -	r = .34 ± .088
Social adjustment and Depressive component - - - - -	r = .36 ± .086
Social adjustment and Autistic component - - - - -	r = .57 ± .067

The relationship of Home adjustment and Intelligence has already been discussed above. The other significant relationships involving the Home adjustment factor, while not very high, are strong enough to suggest that this factor is important to the personality make up of the individual. From the coefficients, it is evident there is a tendency for those with poor home relationships: to manifest poor Health adjustment, poor Emotional adjustment and vice-versa. In addition there seems to be a tendency for those with poor Home adjustment to manifest Depressive and Paranoid temperament components.

The relationships of the Health adjustment factor with Emotional adjustment and the Manic temperament component suggest that the subjects with poorer health are less emotionally balanced and evince a tendency toward Manic traits.

Emotional maladjustment and social maladjustment go hand-in-hand, as evidenced by the relationships; furthermore, the subjects with poor Emotional adjustment tend to show high Manic, Depressive, Autistic and Paranoid temperament components. The inverse relationship between Emotional adjustment and the Normal temperament component reveals that the emotionally maladjusted tend to manifest less well integrated personalities.

The significant coefficients involving the Social adjustment factor show conflicting relationships. As would be expected, there is a high correlation between the Autistic component and the Social adjustment factor, indicating that the subjects showing traits of a retiring personality on one instrument do likewise on the other. On the other hand, it would be expected that the subjects showing a retiring personality on the Bell Inventory would show low Manic and Depressive scores on the Humm-Wadsworth Scale, but such is not the case in this study. Instead there is a tendency for those who show retiring personality on the Bell Inventory to manifest rather strong Manic and Depressive components on the Humm-Wadsworth Scale.

The significant relationships involving the temperament components are*:

Normal component and Emotional adjustment - - - - -	r = -.31 ± .089
Normal component and Manic component - - - - -	r = -.29 ± .091
Normal component and Depressive component - - - - -	r = -.41 ± .082
Normal component and Paranoid component - - - - -	r = -.61 ± .062
Normal component and Epileptoid component - - - - -	r = -.34 ± .088
Hysteroid component and Paranoid component - - - - -	r = .37 ± .085
Manic component and Health adjustment - - - - -	r = .29 ± .091
Manic component and Social adjustment - - - - -	r = .34 ± .088
Manic component and Emotional adjustment - - - - -	r = .38 ± .085
Manic component and Depressive component - - - - -	r = .76 ± .042
Manic component and Autistic component - - - - -	r = .30 ± .090
Depressive component and Home adjustment - - - - -	r = .29 ± .091
Depressive component and Social adjustment - - - - -	r = .36 ± .086
Depressive component and Emotional adjustment - - - - -	r = .64 ± .058
Depressive component and Autistic component - - - - -	r = .44 ± .080
Autistic component and Social adjustment - - - - -	r = .57 ± .067
Autistic component and Emotional adjustment - - - - -	r = .38 ± .085
Epileptoid component and Intelligence - - - - -	r = -.63 ± .060

* The height of the "profile score" indicates the relative strength of the respective temperament component; the higher the score, the stronger the component.

The relationships involving the Normal component tend to suggest that the subjects are inclined to show more of the other components when their Normal component is low.

The coefficient of correlation for the Hysteroid and Paranoid components indicate some degree of positive relationship.

The coefficients involving the Manic component and the adjustment factors have previously been discussed. The relatively high coefficient between the Manic and Depressive components is expected, as both components are common to cycloid personalities. Unexpected, however, is the positive relationship between the Manic and the Autistic components, as these factors ostensibly oppose each other.

The Depressive component in relation to the adjustment tendencies has also been discussed above. Here too, however, the relationship with the Autistic component is unexpected, as those factors are indicative of opposing types of personality.

The remaining significant relationships involving the temperament components have previously been discussed as the variables in connection with the other factors.

RELATIONSHIP BETWEEN JOB EFFICIENCY CRITERIA

The coefficient obtained from correlating the rating scores with the production scores equals $.75 \pm .043$. This indicates that the rating scores are valid and further justifies the use of the rating technique in evaluating job efficiency.

RELATIONSHIPS BETWEEN THE TEST FACTORS AND THE JOB EFFICIENCY CRITERIA

For the zero order correlations, only one significant relationship was obtained among the test factors and the job efficiency criteria:

$r = -.31 \pm .089$ between the Paranoid component of the Humm-Wadsworth Scale and the Scott Graphic Rating scores.

The application of the partial correlation technique tended to raise some of the relationships to significant values. These are pointed out in Tables VII to XIV inclusive, which appear on pages 52 to 55.

It is observed the zero order correlation of $r = .19 \pm .095$, between the Normal component and the job ratings was raised to $.29 \pm .091$ when the Intelligence factor and the Mechanical Aptitude factors were held constant in the fourth order series. Likewise the Hysteroid - job rating relationship was raised from $r = -.26 \pm .092$ to $r = -.38 \pm .085$. The relationship between the Paranoid component and job rating, $r = -.31 \pm .089$, - significant at the outset - was still further raised to $r = -.35 \pm .087$.

None of the relationships between the test factors and the production scores reached significant values, even with the application of the partial correlation technique. Two of the relationships, however, closely approached reliability when the partial correlation method was used: the Normal and Hysteroid components respectively related to the production scores.

The zero order relationship between the normal component and the production scores shows a correlation of $.14 \pm .097$. In the fourth order series of the partial correlations, this coefficient was raised to $.21 \pm .095$, almost a significant value. The Hysteroid - production score relationship was likewise raised from $-.22 \pm .094$ to $-.27 \pm .092$ - just barely below reliability.

TABLE VII

FIRST ORDER PARTIAL CORRELATIONS BETWEEN THE PERSONALITY FACTORS AND THE RATING SCORES WITH INTELLIGENCE AND THE MECHANICAL APTITUDE RESULTS HELD CONSTANT

r 5 - 16.1 = .09	r 5 - 16.2 = .04	r 5 - 16.3 = .06	r 5 - 16.4 = .05
r 6 - 16.1 = -.01	r 6 - 16.2 = -.04	r 6 - 16.3 = -.03	r 6 - 16.4 = -.04
r 7 - 16.1 = .24	r 7 - 16.2 = .26	r 7 - 16.3 = .25	r 7 - 16.4 = .25
r 8 - 16.1 = .05	r 8 - 16.2 = .05	r 8 - 16.3 = .05	r 8 - 16.4 = .04
r 9 - 16.1 = .21	r 9 - 16.2 = .18	r 9 - 16.3 = .18	r 9 - 16.4 = .20
r10 - 16.1 = -.26	r10 - 16.2 = -.28	r10 - 16.3 = -.30	r10 - 16.4 = -.33
r11 - 16.1 = .02	r11 - 16.2 = -.01	r11 - 16.3 = .01	r11 - 16.4 = -.02
r12 - 16.1 = -.12	r12 - 16.2 = -.13	r12 - 16.3 = -.13	r12 - 16.4 = -.14
r13 - 16.1 = -.04	r13 - 16.2 = -.06	r13 - 16.3 = -.05	r13 - 16.4 = -.02
r14 - 16.1 = -.31	r14 - 16.2 = -.33	r14 - 16.3 = -.33	r14 - 16.4 = -.34
r15 - 16.1 = -.07	r15 - 16.2 = .01	r15 - 16.3 = -.03	r15 - 16.4 = .01

TABLE VIII

FIRST ORDER PARTIAL CORRELATIONS BETWEEN THE PERSONALITY FACTORS AND THE PRODUCTION SCORES WITH INTELLIGENCE AND THE MECHANICAL APTITUDE RESULTS HELD CONSTANT

r 5 - 17.1 = -.02	r 5 - 17.2 = -.03	r 5 - 17.3 = -.01	r 5 - 17.4 = -.02
r 6 - 17.1 = .03	r 6 - 17.2 = .02	r 6 - 17.3 = .03	r 6 - 17.4 = .02
r 7 - 17.1 = .11	r 7 - 17.2 = .12	r 7 - 17.3 = .11	r 7 - 17.4 = .11
r 8 - 17.1 = .04	r 8 - 17.2 = .04	r 8 - 17.3 = .04	r 8 - 17.4 = .03
r 9 - 17.1 = .12	r 9 - 17.2 = .14	r 9 - 17.3 = .14	r 9 - 17.4 = .15
r10 - 17.1 = -.22	r10 - 17.2 = -.23	r10 - 17.3 = -.24	r10 - 17.4 = -.27
r11 - 17.1 = -.01	r11 - 17.2 = -.03	r11 - 17.3 = -.01	r11 - 17.4 = -.02
r12 - 17.1 = -.07	r12 - 17.2 = -.07	r12 - 17.3 = -.07	r12 - 17.4 = -.07
r13 - 17.1 = -.07	r13 - 17.2 = -.09	r13 - 17.3 = -.07	r13 - 17.4 = -.06
r14 - 17.1 = -.12	r14 - 17.2 = -.13	r14 - 17.3 = -.13	r14 - 17.4 = -.14
r15 - 17.1 = -.10	r15 - 17.2 = -.09	r15 - 17.3 = -.10	r15 - 17.4 = -.09

TABLE IX

SECOND ORDER PARTIAL CORRELATIONS BETWEEN THE PERSONALITY FACTORS AND THE RATING SCORES WITH INTELLIGENCE AND THE MECHANICAL APTITUDE RESULTS HELD CONSTANT

r 5 - 16.12 = .09	r 5 - 16.13 = .09	r 5 - 16.14 = .08
r 6 - 16.12 = -.03	r 6 - 16.13 = -.02	r 6 - 16.14 = -.03
r 7 - 16.12 = .25	r 7 - 16.13 = .25	r 7 - 16.14 = .25
r 8 - 16.12 = .05	r 8 - 16.13 = .05	r 8 - 16.14 = .04
r 9 - 16.12 = .21	r 9 - 16.13 = .23	r 9 - 16.14 = .22
r10 - 16.12 = -.28	r10 - 16.13 = -.30	r10 - 16.14 = -.33
r11 - 16.12 = .02	r11 - 16.13 = .03	r11 - 16.14 = .00
r12 - 16.12 = -.12	r12 - 16.13 = -.12	r12 - 16.14 = -.13
r13 - 16.12 = -.06	r13 - 16.13 = -.05	r13 - 16.14 = -.02
r14 - 16.12 = -.33	r14 - 16.13 = -.33	r14 - 16.14 = -.34
r15 - 16.12 = -.08	r15 - 16.13 = -.11	r15 - 16.14 = -.06

TABLE X

SECOND ORDER PARTIAL CORRELATIONS BETWEEN THE PERSONALITY FACTORS AND THE PRODUCTION SCORES WITH INTELLIGENCE AND MECHANICAL APTITUDE RESULTS HELD CONSTANT

r 5 - 17.12 = -.03	r 5 - 17.13 = -.02	r 5 - 17.14 = -.03
r 6 - 17.12 = .02	r 6 - 17.13 = .03	r 6 - 17.14 = .02
r 7 - 17.12 = .12	r 7 - 17.13 = .11	r 7 - 17.14 = .12
r 8 - 17.12 = .04	r 8 - 17.13 = .04	r 8 - 17.14 = .03
r 9 - 17.12 = .14	r 9 - 17.13 = .15	r 9 - 17.14 = .15
r10 - 17.12 = -.23	r10 - 17.13 = -.24	r10 - 17.14 = -.27
r11 - 17.12 = -.01	r11 - 17.13 = -.01	r11 - 17.14 = -.02
r12 - 17.12 = -.07	r12 - 17.13 = -.07	r12 - 17.14 = -.07
r13 - 17.12 = -.09	r13 - 17.13 = -.07	r13 - 17.14 = -.06
r14 - 17.12 = -.13	r14 - 17.13 = -.13	r14 - 17.14 = -.14
r15 - 17.12 = -.11	r15 - 17.13 = -.12	r15 - 17.14 = -.09

TABLE XI

THIRD ORDER PARTIAL CORRELATIONS BETWEEN THE
PERSONALITY FACTORS AND THE RATING SCORES WITH
INTELLIGENCE AND THE MECHANICAL APTITUDE RE-
SULTS HELD CONSTANT

r 5 - 16.123 = .09	r 5 - 16.124 = .08
r 6 - 16.123 = -.03	r 6 - 16.124 = -.04
r 7 - 16.123 = .25	r 7 - 16.124 = .26
r 8 - 16.123 = .05	r 8 - 16.124 = .04
r 9 - 16.123 = .22	r 9 - 16.124 = .27
r10 - 16.123 = -.30	r10 - 16.124 = -.33
r11 - 16.123 = .03	r11 - 16.124 = .01
r12 - 16.123 = -.12	r12 - 16.124 = -.13
r13 - 16.123 = -.06	r13 - 16.124 = -.04
r14 - 16.123 = -.34	r14 - 16.124 = -.35
r15 - 16.123 = -.10	r15 - 16.124 = -.08

TABLE XII

THIRD ORDER PARTIAL CORRELATIONS BETWEEN THE
PERSONALITY FACTORS AND THE PRODUCTION SCORES
WITH INTELLIGENCE AND MECHANICAL APTITUDE RE-
SULTS HELD CONSTANT

r 5 - 17.123 = -.03	r 5 - 17.124 = -.04
r 6 - 17.123 = .02	r 6 - 17.124 = .01
r 7 - 17.123 = .12	r 7 - 17.124 = .13
r 8 - 17.123 = .04	r 8 - 17.124 = .04
r 9 - 17.123 = .14	r 9 - 17.124 = .20
r10 - 17.123 = -.24	r10 - 17.124 = -.26
r11 - 17.123 = -.01	r11 - 17.124 = -.02
r12 - 17.123 = -.07	r12 - 17.124 = -.07
r13 - 17.123 = -.09	r13 - 17.124 = -.08
r14 - 17.123 = -.13	r14 - 17.124 = -.14
r15 - 17.123 = -.12	r15 - 17.124 = -.10

TABLE XIII

FOURTH ORDER PARTIAL CORRELATIONS BETWEEN THE PERSONALITY FACTORS AND THE RATING SCORES WITH INTELLIGENCE AND THE MECHANICAL APTITUDE RESULTS HELD CONSTANT

r 5 - 16.1234 =	.08
r 6 - 16.1234 =	.04
r 7 - 16.1234 =	.26
r 8 - 16.1234 =	.05
r 9 - 16.1234 =	.29
r10 - 16.1234 =	-.38
r11 - 16.1234 =	.02
r12 - 16.1234 =	-.12
r13 - 16.1234 =	-.05
r14 - 16.1234 =	-.35
r15 - 16.1234 =	-.09

TABLE XIV

FOURTH ORDER PARTIAL CORRELATIONS BETWEEN THE PERSONALITY FACTORS AND THE PRODUCTION SCORES WITH INTELLIGENCE AND THE MECHANICAL APTITUDE RESULTS HELD CONSTANT

r 5 - 17.1234 =	-.04
r 6 - 17.1234 =	.00
r 7 - 17.1234 =	.13
r 8 - 17.1234 =	.03
r 9 - 17.1234 =	.21
r10 - 17.1234 =	-.27
r11 - 17.1234 =	-.02
r12 - 17.1234 =	-.07
r13 - 17.1234 =	-.14
r14 - 17.1234 =	-.14
r15 - 17.1234 =	-.10

Among the other relationships found in the study, the following are worthy of note:

Intelligence and rating score - - - - -	r = -.08 ± .098
Intelligence and production score - - - - -	r = .02 ± .099
Finger dexterity and rating score - - - - -	r = -.19* ± .095
Finger dexterity and production score - - - - -	r = -.14 ± .097
Rate of manipulation (placing) and rating score - - - - -	r = -.17 ± .096
Rate of manipulation (placing) and production scores - - - - -	r = -.07 ± .099
Rate of manipulation (turning) and rating score - - - - -	r = -.19 ± .095
Rate of manipulation (turning) and production score - - - - -	r = -.14 ± .097

These correlations are obviously low and unreliable. This may be due to the fact that the subjects were chosen, for the most part, on the basis of their intelligence, finger dexterity and rate of manipulation test scores. Lower correlations are to be expected when the range of scores is decreased.

THE QUALITATIVE DISTRIBUTION OF THE PERSONALITY COMPONENTS

The qualitative distributions of the Humm-Wadsworth temperament components, in relation to the mean rating and production scores, appear in Tables XV, page 57, and XVI, page 58.

For the group as a whole, a total of sixty cases, or 58.8 percent, exceed the mean rating score; whereas forty-two cases, or 41.2 percent, fall below the average. On the basis of the component distributions, only the cases diagnosed as Normal, Epileptoid and Colorless exceed this ratio. The other components, especially the Paranoids and the Hysteroids, contribute a greater percentage of the cases which fall below the mean ratings.

* It is noted that the mechanical aptitude factors correlate inversely with the job success criteria. Actually these relationships are to be construed as positive, due to the fact that the higher scores (time scores) on the mechanical tests indicate lesser aptitude and vice-versa.

TABLE XV

THE QUALITATIVE DISTRIBUTION OF THE TEMPERAMENT
COMPONENT CATEGORIES FALLING ABOVE AND BELOW
THE MEAN RATING SCORE

<u>Subjects</u>	<u>No. of Cases**</u>	<u>Above Mean Rating Score*</u>		<u>Below Mean Rating Score*</u>	
		<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
All Subjects	102	60	58.8	42	41.2
Normal	33	20	60.6	13	39.4
Hysteroid	3	1	33.3	2	66.7
Manic	55	29	52.7	26	47.3
Depressive	31	16	51.6	15	48.4
Autistic	9	4	44.4	5	55.6
Paranoid	18	7	38.9	11	61.6
Epileptoid	9	7	77.8	2	22.2
Colorless***	11	8	72.7	3	27.3

* M = 47.40

** The total number of temperament component categories in greater than the actual number of cases, as some subjects manifest two or more components.

*** Colorless signifies that the subject manifests no component strong enough to reach the +1 range on the Humm-Wadsworth Temperament Scale profile (See sample profile in appendix).

TABLE XVI

THE QUALITATIVE DISTRIBUTION OF THE TEMPERAMENT
COMPONENT CATEGORIES FALLING ABOVE AND BELOW
THE MEAN PRODUCTION SCORE*

<u>Subjects</u>	<u>No. of Cases</u>	<u>Above Mean Production</u>		<u>Below Mean Production</u>	
		<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
All Subjects	102	64	62.7	38	37.3
Normal	33	23	69.7	10	30.3
Hysteroid	3	1	38.3	2	66.7
Manic	55	34	61.8	21	38.2
Depressive	31	17	54.8	14	45.2
Autistic	9	5	55.6	4	44.4
Paranoid	18	10	55.6	8	44.4
Epileptoid	9	5	55.6	4	44.4
Colorless	11	6	54.5	5	45.5

* M = 103.14

Again for the group as a whole, a total of sixty-four cases, or 62.7 percent, surpass the mean production score; thirty-eight cases, or 37.3 percent, fall below the production mean. This ratio is exceeded only by the cases diagnosed as Normal; it is closely approached, however, by the cases classified as Manic. The other component categories contribute greater percentages of the cases which fall below the mean production score.

The qualitative distributions for the adjustment factors of the Bell Inventory, in relation to the mean rating and production scores, are presented in Tables XVII and XVIII, on pages 60 and 61.

The findings indicated are as follows:

The general distribution of the subjects in terms of the rating scores shows 58.8 percent of the cases scoring above and 41.2 percent below the mean rating. In terms of the general spread of the production scores, 62.7 percent of the subjects are found above the mean score, whereas 37.3 percent fall below that level.

In comparison with those ratios, the findings in terms of the respective Bell categories are:

a. Home Adjustment.

1. The subjects who show above average Home Adjustment fail to reach the ratios shown above for the general distributions in terms of the rating and production scores.

2. The subjects manifesting average Home Adjustment exceed the respective ratios, for both the rating score and production score distributions, by wide margins.

3. The subjects revealing below average Home Adjustment are found in greater percentage below the mean rating score. On the other hand, the

TABLE XVII

THE QUALITATIVE DISTRIBUTION OF THE BELL ADJUSTMENT
CATEGORIES FALLING ABOVE AND BELOW THE MEAN RATING SCORE*

<u>Adjustment</u>	<u>Description**</u>	<u>No. of Cases</u>	<u>Above Mean Rating</u>		<u>Below Mean Rating</u>	
			<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Home	All Subjects	102	60	58.8	42	41.2
	Above	60	33	55.0	27	45.0
	Average	33	23	69.7	10	30.3
	Below	9	4	44.4	5	55.6
Health	All Subjects	102	60	58.8	42	41.2
	Above	86	47	54.7	39	45.3
	Average	15	13	86.7	2	13.3
	Below	1	0	0.0	1	100.0
Social	All Subjects	102	60	58.8	42	41.2
	Aggressive	32	18	56.2	14	43.8
	Average	56	31	55.4	25	44.6
	Retiring	14	11	78.6	3	21.4
Emotional	All Subjects	102	60	58.8	42	41.2
	Above	56	34	60.7	22	39.3
	Average	38	21	55.3	17	44.7
	Below	8	5	62.5	3	37.5

* M = 47.40

** The description, "Above", includes the Excellent and Good adjustment categories of the Bell Inventory. "Below" includes the Unsatisfactory and Very Unsatisfactory groups.

TABLE XVIII

THE QUALITATIVE DISTRIBUTION OF THE BELL ADJUSTMENT
CATEGORIES FALLING ABOVE AND BELOW THE MEAN PRODUCTION SCORE*

<u>Adjustment</u>	<u>Description</u>	<u>No. of Cases</u>	<u>Above Mean Production</u>		<u>Below Mean Production</u>	
			<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Home	All Subjects	102	64	62.7	38	37.3
	Above	62	36	58.1	26	41.9
	Average	34	24	70.6	10	29.4
	Below	6	4	66.7	2	33.3
Health	All Subjects	102	64	62.7	38	37.3
	Above	89	56	62.9	33	37.1
	Average	12	8	75.0	4	25.0
	Below	1	0	0.0	1	100.0
Social	All Subjects	102	64	62.7	38	37.3
	Aggressive	32	19	59.4	13	40.6
	Average	55	34	61.8	21	38.2
	Retiring	15	11	73.3	4	26.7
Emotional	All Subjects	102	64	62.7	38	37.3
	Above	55	33	60.0	22	40.0
	Average	39	27	69.2	12	30.8
	Below	8	4	50.0	4	50.0

* M = 103.14

same group manifests a greater percentage of cases above the mean in terms of the production score spread - greater, in fact, than is found for the general production score ratio of the cases above and below the mean.

b. Health Adjustment.

1. In respect to the rating scores, the subjects showing above average Health Adjustment show a lower ratio than that of the general distribution. For the production score distribution, however, the ratio is equaled.

2. The subjects manifesting average Health Adjustment scores are found in widely greater proportion above the rating and production score means. In both cases the results exceed the general distribution ratios.

3. Only one subject manifests below average Health Adjustment; hence no valid evaluation may be made.

c. Social Adjustment.

1. The subjects classified as Aggressive, with respect to Social Adjustment, show slightly lower ratios of cases falling above and below the mean than are found in the general distributions for both the rating and production scores.

2. The subjects showing Average Social Adjustment present a generally similar picture to that of the Aggressive category.

3. With respect to the cases classified as Retiring, it is seen that a much larger percentage of cases are found above the mean rating and production scores. In both instances the ratios are substantially greater than is found for the general distributions.

d. Emotional Adjustment.

1. The subjects scoring above average in Emotional Adjustment show ratios, of the cases falling above and below the mean rating and production scores, generally similar to the ratios found for the general distributions.

2. The cases of Average Emotional Adjustment show a slightly lower ratio for the rating score distribution in comparison with the general spread; whereas the ratio is found to be higher in terms of the production score results.

3. The subjects manifesting below average Emotional Adjustment appear in greater percentage among the cases falling above the mean rating score - exceeding even the general distribution. With respect to the production scores, the cases of below average Emotional Adjustment are found in equal distribution above and below the mean value.

Generally speaking, the results shown in the above analysis of the Bell Adjustment Inventory are inconsistent. The value of this instrument to personnel men in the selection of workers is, therefore, questionable.

CHAPTER V

DISCUSSION, SUMMARY AND CONCLUSIONS

DISCUSSION

This investigation has concerned itself with the possibility of estimating job success by means of the application of various psychological measuring devices. For purposes of comparison, measures of intelligence, mechanical aptitude and personality were employed. This study, in a sense, departs from the published researches in this field, because the personality factors (home, health, social and emotional adjustment and temperament) are stressed in this investigation.

In the past, job analyses and job descriptions were concerned, for the most part, with the work to be done, the tools to be used and the movements to be employed. For a time, management was vitally concerned with cutting down excess motion by the use of jigs and fixtures and other labor saving devices. With the onset of the present war, the increased need for the services of women and the physically handicapped in industry, caused management to turn their attention to reduction of the physical demands of the job in order that the work could be done by those with less physical ability.

Despite these two approaches, the mechanical and the physical, labor turnover has been heavy. The degree of job dissatisfaction has magnified the need for a third approach, namely the personal. In line with this, a number of studies have been made, as pointed out in Chapter II. None of those investigations, however, attempted to estimate objectively the rela-

tionships between the personality attributes of the individual and job adjustment. It was with this idea in mind that this research was undertaken.

The findings of this investigation, in addition to adding further light on the subject of job adjustment, tend to affirm the results of the earlier related studies. The comparative findings are discussed below.

Intelligence, it appears from the results obtained in this study, bears little relationship to successful adjustment of the individual to the position of assembler. This finding is in agreement with other studies involving simple routine manipulative jobs. A study of bench workers conducted at the Hawthorne Plant of the Western Electric Company, for example, revealed that Otis scores showed practically no relation to the success or failure of the subjects on their jobs.⁷⁹ Another study of the routine manipulative work, by Tiffin and Greenly,⁸⁰ showed low negative relationships between Otis scores and job success - as indicated by production records and supervisors' ratings.

Despite the fact that a standardized group test of mental ability - as employed in this study - showed little value in predicting the success of workers engaged in a routine, manipulative job, there is still justification for its use in a personnel section test battery for jobs of that nature. It was pointed out by Ponds and Bills⁸¹ that labor turnover can be markedly

79. "Analysis of 1935 - 39 Experience in Selecting Men for Shop Occupations," Privately Printed Monograph, Western Electric Company, Hawthorne Plant, Illinois, 1939.

80. Joseph Tiffin and R. J. Greenly, "Employee Selection Tests for Electrical Fixture Assemblers and Radio Assemblers," Journal of Applied Psychology, Vol. 23, 1939. pp. 240 - 263.

81. Millicent Pond and Marion A. Bills, "Intelligence and Clerical Jobs. Two Studies of Relation of Test Score to Job Held," Personnel Journal, Vol. 12, 1933. pp. 41 - 56.

reduced by placing workers in jobs commensurate with their intelligence. It would seem advisable, therefore, that mental level be known in order that the job applicants who are mentally below or above the requirements of the tasks involved may be eliminated from consideration for employment in that specific job.

The correlations between dexterity and the job success variables obtained in this study ($-.14$ with production and $-.19$ with rating), while lower than those found in other researches, indicate an essentially similar trend: a low positive relationship. (It is to be noted that in this study these correlations appear as negative values. This is accounted for in the method by which the data were treated. This fact has previously been discussed in Chapter III.*) It is likely that the selection factors and homogeneity of the group tended to reduce the magnitude of the correlations obtained in this research.

Hayes⁸², in comparison, obtained correlations of $.31$ and $.37$ between finger dexterity (measured by Hayes Pegboard I) and job success - as indicated by a composite of supervisors' ratings and production scores for the former correlation and production scores alone, for the latter. Tiffin and Greenly,⁸³ in a study of electrical fixture assemblers, found correlations of $.22$ and $.33$ between finger dexterity (measured by the O'Connor test) and productivity - indicated by earnings - and merit ratings. They further reported,

* See footnote: p. 56.

82. Eleanor Hayes, "Selecting Women For Shop Work," Personnel Journal, Vol. 11, 1932. pp. 69 - 85.

83. Tiffin and Greenly, Op. cit., pp. 240 - 263.

in the same study, a .27 relationship between finger dexterity and merit ratings for a group of radio assemblers.

The relationships obtained in this study between the manual dexterity factors and the job success criteria were also low and positive. Apparently no other studies along this vein have been published to date; therefore, further research on the problem would seemingly be desirable.

As pointed out in Chapter II, many studies have been made which are related more or less to the problem of personality in job adjustment; many of these findings are further reflected in this study.

It is seen, from Adler's investigation of unemployed men who were admitted to the Boston Psychopathic Hospital in 1917, that forty-three percent of the cases manifested paranoid personalities. When one considers the low rate of unemployment prevalent at that time, it is reasonable to infer that the unemployment of this group was largely a consequence of job maladjustment arising from their personality disorder. In the present study it was similarly found that the subjects who revealed paranoid temperaments were least successful on the job. Further research, however, is obviously needed, with regard to personality as related to job differences before positive conclusions may be drawn concerning personality - work relationships.

In general the earlier studies, cited in Chapter II, revealed that personality maladjustment is significantly related to poor work adjustment. Included in this group are the researches of Jarrett, Brewer, Anderson, Reed, Hersey, McMurray, Mayo, Hanna and Goldstein. Similar findings are also indicated, to a degree, in the present study.

This investigation, on the other hand, shows that the subjects who evince strong normal temperaments or colorless temperament configurations (those in which no trait is significantly strong) manifest a greater tendency toward job success on the basis of the criteria measured. Similar findings are revealed in Wadsworth's study of aircraft workers.

It was determined further in the study at hand that the introverted subjects adjust more readily to assembly work than do the extraverted personalities. This finding is not surprising in view of the nature of the tasks involved: routine repetitive work. This determination apparently coincides with that of Wrenn's study which indicated that social dominance and level of jobs are positively related. It has also been shown, on the other hand, that work involving diverse tasks and social intercourse, such as exemplified in the work of salesman, is best suited for extraverted personalities. The studies of Anderson and Schultz, with regard to sales personnel, bear out this point.

Finally, this study affirms the validity of the merit rating technique as an instrument for evaluating the work progress of the individual. Earlier studies by Grauer and Schultz, as previously described in Chapter II, indicated that production records and the ratings of job success were in close accord. The significantly high correlation obtained in this study seems to bear out this fact.

From an overall point of view, then, the results of this study indicate that certain personality traits, measured in this research, are related to job success. This conclusion validates the findings of previous studies and seems to emphasize the importance of personality in relation to job adjustment.

Despite the limitations inherent in the questionnaire approach to personality, this study has indicated it to be a useful supplement in personnel selection. It would appear that the diligent personnel worker might work out a personality "Gestalt" for the jobs within his plant and thereby make his selection of personnel more effective.

One must not, however, overestimate the value of the personality approach as a selective technique, because only a few of the traits have been shown to be related significantly to job success. The personality factor becomes increasingly important, however, when other screening devices, such as tests of intelligence and mechanical aptitude, are applied in employee selection.

It is probable that the personality factors, as measured, did not result in better prediction, due to the limited personality samples employed on the Bell and Humm-Wadsworth tests. It would be interesting to see how accurately a large battery of these tests would predict job success. It may well be, also, that the very simplicity of the job studied precluded shades of personality from entering into the picture and that on somewhat more complex or specialized tasks, personal traits of the worker would forge to the fore more readily.

In conclusion, then, one might say that traits of personality, as measured by available tests, appear to be a factor in adjustment, not only to life as a whole, but also to the narrower fields of education and work. The ramifications for the personnel worker or guidance counselor, are, to say the least, challenging.

SUMMARY

This study was undertaken to determine the relationships between various personality attributes and adjustment in a simple light manufacturing job. The personality attributes which were studied included: (a) Home, Health, Social and Emotional Adjustment and (b) the Normal, Hysteroid, Manic, Depressive, Autistic, Paranoid and Epileptoid components of what Rosanoff called the "temperament configuration."

The subjects of the investigation included, at the outset, 134 females, between the ages of eighteen and forty-five, who passed the pre-employment requirements for the job. Later the group was reduced to 114, as twenty of the subjects were eliminated from the study due to invalid test results on the Humm-Wadsworth Scale. Before the end of the experimental four-month work period, twelve of the group terminated the job for diverse reasons. As the final criteria of job success could not be evaluated for those who left, the data for the "quit" cases were separated from the main body of the research. The principal group, then, was comprised of 102 subjects.

The instruments used in this study included: the Otis Self-Administering Test of Mental Ability, Intermediate Examination, Form A; the O'Connor Finger Dexterity Test; the Minnesota Rate of Manipulation Test; the Bell Adjustment Inventory; the Humm-Wadsworth Temperament Scale; the Scott Graphic Rating Scale; and the company records of material output.

The method of the research was as follows:

The subjects were selected, to begin with, on the basis of their intelligence and mechanical aptitude test scores. To those who qualified were administered the tests of personality. With the test series completed,

the entire group, including the cases who were no longer considered as part of the study because of their invalid Humm-Wadsworth Scales, reported to their work stations. No attempt was made to separate the "in" and "out" workers, as it was desired that the working conditions of this shop approximate similar shops throughout the plant. At no time were the girls notified that they were serving as research subjects; not even the superiors, who ultimately rated the group for job efficiency, were informed of the experiment until two days prior to the actual rating date.

The experimental work period was of four months duration. No checking of any sort was done on the subject, except for exit interviews which were given to the twelve girls who terminated the job before the close of the experimental period. After four months of work had elapsed, the subjects were rated for job success by their immediate supervisor, and an assistant subforeman of their department. Both of the raters had previous experience in rating technique. The material output records for the subjects were then collected and analyzed. A production score was derived for each girl on the basis of her average hourly output of material units, that passed inspection standards, for her last forty hours of work.

Finally the data were analyzed and compared by means of average scores and coefficients of correlation. In the light of the data, the following results were obtained:

1. In general the subjects of the research were well suited for the work for which they were employed. From the company's job summary, described in Chapter III, it is seen that the specifications called for good finger and manual dexterity and sufficient intelligence to learn the tasks

involved. The average Otis score of fifty-one made by the group is equivalent to the twenty-fifth percentile of ninth grade students and falls within the range of normal intelligence on the basis of the Otis scale. The average mental level, then, was satisfactory from the standpoint of the job requirement. The group was also qualified with respect to the dexterity requisite, as the subjects on the whole were well above the average population in comparison with the test standardization and company norms.

2. The subjects who terminated the job before the conclusion of the experimental period were generally similar to the main experimental group, according to the data, with respect to their average mental level and dexterity.

3. The coefficients of correlation between intelligence and the job success criteria, $-.08$ with job adjustment ratings and $.02$ with production scores, are essentially the same as found previously by other investigators of the problem. In general there seems to be little correlation between those variables when the work concerned is of a simple routine nature. Evidently, the skills called for in this task had slight relationship to the type of verbal ability sampled by the Otis test.

4. The coefficient of correlation between intelligence and home adjustment ($r = .31$) indicates a positive relationship between levels of mental ability and unsatisfactory family adjustment. The fact that those of higher intelligence showed themselves to be less well adjusted to their home environments might be due to the fact that those of higher mental level were more apt to recognize the social shortcomings within their respective homes. More specifically, those of higher intelligence among the group were

more likely to note the failings of their parents or siblings, to be dissatisfied with their home environment, and aspire to surmount home conditions.

5. The comparatively high negative correlation between intelligence and the Epileptoid temperament component might appear to indicate that the Epileptoid personalities are generally of lower intelligence. On the other hand, the low intelligence scores made by those cases might be attributed to the fact that Epileptoid personalities are not readily adaptable to "speed" tests, inasmuch as their responses are usually slow and deliberate. Further research on this particular finding should prove fruitful.

6. The mechanical aptitude tests: finger dexterity, placing and turning, failed to "come through" in predicting job success as highly as was anticipated on the basis of previous studies. The correlations obtained ($r = -.07$ to $r = -.19$), while consistent, are far too low to be reliable. Perhaps selection was a factor, or the homogeneity of the group.

7. The inter-test correlations for the Bell Adjustment Inventory are essentially the same as found by the author. In general, the correlations are logical and consistent. The mean scores obtained in this study for the adjustment traits, are, with the exception of the Health adjustment category, the same as those found by Bell with his standardization group. The average Health adjustment score, as determined in this investigation, is lower than that found by Bell, indicating that the experimental group, on the whole, showed better health adjustment. This finding is probably due to the fact that a medical examination was part of the selection procedure. It is likely that those individuals who would have evinced poorer health adjustment, in terms of the inventory, were eliminated by the examining physicians.

8. The inter-test correlations for the Humm-Wadsworth Temperament Scale are also, for the most part, logical and consistent. The Normal component manifests negative relationships with the other temperament components. This finding bears out the contention of the test authors to the effect that the Normal traits are the inhibiting or integrating forces - the "Balance wheel" - of the temperament configuration. Inconsistent with the anticipated findings are the positive coefficients (.11 to .44) obtained for the relationships of the Manic and Depressive components with the Autistic and Paranoid factors. Essentially the two pairs of components are opposed to each other - the former of cycloid and the latter of schizoid personality; negative relationships were, therefore, expected between the pairs. Because of this unexpected finding, further study of the problem is suggested.

9. The high correlation found between the production scores and the job ratings ($r = .75$) indicates that the rating technique was a valid one for appraising job success in this study. However, attention is called to the fact that the ratings were made by persons who thoroughly understood the procedure and who were closely familiar with the individuals who were judged. It would appear that those two conditions must be met for the valid use of the rating scale.^{84, 85.}

10. The Home, Health and Emotional adjustment factors of the Bell inventory show practically no correlation whatsoever with the job success criteria. Low positive correlations were found between the Social adjustment

84. Tiffin, Op. cit., p. 231.

85. P. M. Symonds, Diagnosing Personality And Conduct, D. Appleton-Century Co., New York, 1931. pp. 47 - 50.

factor and the job ratings ($r = .24$) and production scores ($r = .11$) indicating that the subjects with retiring personalities tended to be more successful on the job. Even the application of the partial correlation technique, with as many as four factors held constant, failed to bring out more significant relationships. Generally speaking, the overall contribution of the Bell inventory to the prediction of job success may be considered negligible.

11. The Normal component is the only one of the seven Humm-Wadsworth temperament factors which correlates positively with the job success criteria. The correlations ($r = .19$ and $r = .14$ with the rating scales and production scores respectively), were further raised through the partial correlation technique. The resulting coefficients ($r = .29$ and $r = .21$) while not very high, do, nevertheless, consistently show that there is a tendency for the subjects manifesting the Normal component to be more successful in the job considered.

The Hysteroid and Paranoid temperament components are found to correlate negatively with the criteria of job success, indicating that the subjects who manifest these components are less likely to succeed on a simple assembly job. The zero-order correlations obtained for the Hysteroid factor with the job ratings and production scores are $-.26$ and $-.22$ respectively. Through partial correlation, with intelligence and the mechanical aptitude factors held constant, the coefficients were raised to $-.38$ and $-.27$. The zero-order correlations found for the Paranoid temperament component and the job success criteria are $-.31$ and $-.12$. These correlations were increased but slightly to $-.35$ and $-.14$ when the partial correlation technique was applied.

The Manic, Depressive, Autistic and Epileptoid temperament components show, in general, practically no relationship with the criteria of job success.

A qualitative analysis of the temperament configurations which characterize the more successful assemblers likewise reveals that the subjects diagnosed of Normal temperament are found in greater percentage among the subjects who show themselves to be better than average on the job. On the other hand the subjects classified as Hysteroid and Paranoid are inclined to fall in greater percentage among those who do less well than the average on the job.

The individuals who manifest no positive component at all are classified as Colorless. This designation signifies that no single component of the temperament configuration is strong enough to reach the plus one (+1) range on the Humm-Wadsworth profile. Of the 102 subjects included in the study, only eleven were so classified. Those cases, in general, are found in greater percentage among the subjects who are more successful on the job.

As an overall picture, then, the individuals who manifest positive Normal components or completely colorless temperaments are more likely to succeed in a routine assembly job; whereas those manifesting positive Paranoid and Hysteroid traits are more likely to do less well in that type of work.

CONCLUSIONS

In the light of the findings of this investigation, the following conclusions are advanced:

1. In general the relationships between the various attributes studied and the criteria of job success are low; yet the instruments used are of value to the selection of workers for simple, mechanical assembly jobs, as they manifest certain trends significant to job adjustment. It is probable that generally low coefficients of correlation were obtained because of the homogeneity of the group - brought about, perhaps, as a result of the selective factors which were applied in choosing the subjects.

2. Successful adjustment to a simple mechanical assembly job is contingent to an extent upon intelligence, finger and manual dexterity and the general personality make-up of the individual to the degree that they have been measured in this study.

3. In selecting workers for simple mechanical assembly jobs, with other things being equal, there is greater likelihood that the individuals who manifest colorless temperaments, or strong Normal components and tend toward introversion will adjust more readily to that type of work. On the other hand, persons of Hysteroid and Paranoid temperaments and extraverted personalities are less likely to succeed in jobs of that nature.

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APPENDIX

TABLE XIX

THE QUALITATIVE DISTRIBUTION OF THE TEMPERAMENT
COMPONENT CATEGORIES MANIFESTED BY THE TWELVE
SUBJECTS WHO TERMINATED THE JOB

<u>Component</u>	<u>Number of Subjects*</u>	<u>Percent of group</u>
Normal	4	33.3
Hysteroid	0	0.0
Manic	7	58.3
Depressive	5	41.7
Autistic	1	8.3
Paranoid	3	25.0
Epileptoid	1	8.3
Colorless	1	8.3

*Some subjects manifested two or more components

TABLE XX

THE QUALITATIVE DISTRIBUTION OF THE BELL ADJUSTMENT
CATEGORIES MANIFESTED BY THE TWELVE SUBJECTS WHO
TERMINATED THE JOB

<u>Adjustment</u>	<u>Description</u>	<u>No.</u>	<u>%</u>
Home	All Categories	12	100.0
	Excellent	5	41.7
	Good	1	8.3
	Average	3	25.0
	Unsatisfactory	1	8.3
	Very Unsatisfactory	2	16.7
Health	All Categories	12	100.0
	Excellent	4	33.0
	Good	3	25.0
	Average	5	41.7
	Unsatisfactory	0	0.0
	Very Unsatisfactory	0	0.0
Social	All Categories	12	100.0
	Very Aggressive	3	25.0
	Aggressive	1	8.3
	Average	5	41.7
	Retiring	3	25.0
	Very Retiring	0	0.0
Emotional	All Categories	12	100.0
	Excellent	1	8.3
	Good	3	25.0
	Average	7	58.3
	Unsatisfactory	1	8.3
	Very Unsatisfactory	0	0.0

TABLE XXI

REASONS FOR JOB TERMINATION OF THE GROUP WHO FAILED
TO REMAIN FOR THE DURATION OF THE EXPERIMENT PERIOD

<u>Number of Subjects</u>	<u>Reason for Termination</u>
5	Disliked the work
2	Illness in family
2	Left without notice
1	Personal illness
1	Transportation dif- ficulties
1	Joined husband in armed forces

OTIS SELF-ADMINISTERING TESTS OF MENTAL ABILITY

By ARTHUR S. OTIS, PH.D.

Formerly Development Specialist with Advisory Board, General Staff, United States War Department

INTERMEDIATE EXAMINATION: FORM A

For Grades 4-9

20

Score.....

Read this page. Do what it tells you to do.

Do not open this paper, or turn it over, until you are told to do so. Fill these blanks, giving your name, age, birthday, etc. Write plainly.

Name.....Age last birthday.....years
First name, initial, and last name

Birthday.....Teacher.....Date.....19....
Month Day

Grade.....School.....City.....

This is a test to see how well you can think. It contains questions of different kinds. Here is a sample question already answered correctly. Notice how the question is answered:

Sample: Which one of the five words below tells what an apple is?

1 flower, 2 tree, 3 vegetable, 4 fruit, 5 animal..... (4)

The right answer, of course, is "fruit"; so the word "fruit" is underlined. And the word "fruit" is No. 4; so a figure 4 is placed in the parentheses at the end of the dotted line. This is the way you are to answer the questions.

Try this sample question yourself. Do not write the answer; just draw a line under it and then put its number in the parentheses:

Sample: Which one of the five things below is round?

1 a book, 2 a brick, 3 a ball, 4 a house, 5 a box.....()

The answer, of course, is "a ball"; so you should have drawn a line under the words "a ball" and put a figure 3 in the parentheses. Try this one:

Sample: A foot is to a man and a paw is to a cat the same as a hoof is to a — what?

1 dog, 2 horse, 3 shoe, 4 blacksmith, 5 saddle.....()

The answer, of course, is "horse"; so you should have drawn a line under the word "horse" and put a figure 2 in the parentheses. Try this one:

Sample: At four cents each, how many cents will 6 pencils cost?.....()

The answer, of course, is 24, and there is nothing to underline; so just put the 24 in the parentheses.

If the answer to any question is a number or a letter, put the number or letter in the parentheses without underlining anything. Make all letters like printed capitals.

The test contains 75 questions. You are not expected to be able to answer all of them, but do the best you can. You will be allowed half an hour after the examiner tells you to begin. Try to get as many right as possible. Be careful not to go so fast that you make mistakes. Do not spend too much time on any one question. No questions about the test will be answered by the examiner after the test begins. Lay your pencil down.

Do not turn this page until you are told to begin.

EXAMINATION BEGINS HERE.

1. Which one of the five things below does not belong with the others?
1 potato, 2 turnip, 3 carrot, 4 stone, 5 onion..... (Do not write on these dotted lines.) ()
2. Which one of the five words below tells best what a saw is?
1 something, 2 tool, 3 furniture, 4 wood, 5 machine..... ()
3. Which one of the five words below means the opposite of west?
1 north, 2 south, 3 east, 4 equator, 5 sunset..... ()
4. A hat is to a head and a glove is to a hand the same as a shoe is to what?
1 leather, 2 a foot, 3 a shoestring, 4 walk, 5 a toe..... ()
5. A child who knows he is guilty of doing wrong should feel (?)
1 bad, 2 sick, 3 better, 4 afraid, 5 ashamed..... ()
6. Which one of the five things below is the smallest?
1 twig, 2 limb, 3 bud, 4 tree, 5 branch..... ()
7. Which one of the five things below is most like these three: cup, plate, saucer?
1 fork, 2 table, 3 eat, 4 bowl, 5 spoon..... ()
8. Which of the five words below means the opposite of strong?
1 man, 2 weak, 3 small, 4 short, 5 thin..... ()
9. A finger is to a hand the same as a toe is to what?
1 foot, 2 toenail, 3 heel, 4 shoe, 5 knee..... ()
10. Which word means the opposite of sorrow?
1 sickness, 2 health, 3 good, 4 joy, 5 pride..... ()
11. Which one of the ten numbers below is the smallest? (Tell by letter.)
A 6084, B 5160, C 4342, D 6521, E 9703, F 4296, G 7475, H 2657, J 8839, K 3918 ()
12. Which word means the opposite of pretty?
1 good, 2 ugly, 3 bad, 4 crooked, 5 nice..... ()
13. Do what this mixed-up sentence tells you to do.
number Write the the in 5 parentheses..... ()
14. If we believe some one has committed a crime, but we are not sure, we have a (?)
1 fear, 2 suspicion, 3 wonder, 4 confidence, 5 doubtful..... ()
15. A book is to an author as a statue is to (?)
1 sculptor, 2 marble, 3 model, 4 magazine, 5 man..... ()
16. Which is the most important reason that words in the dictionary are arranged alphabetically?
1 That is the easiest way to arrange them. 2 It puts the shortest words first. 3 It enables us to find any word quickly. 4 It is merely a custom. 5 It makes the printing easier.. ()
17. Which one of the five things below is most like these three: plum, apricot, apple?
1 tree, 2 seed, 3 peach, 4 juice, 5 ripe..... ()
18. At 4 cents each, how many pencils can be bought for 36 cents?..... ()
19. If a person walking in a quiet place suddenly hears a loud sound, he is likely to be (?)
1 stopped, 2 struck, 3 startled, 4 made deaf, 5 angered..... ()
20. A boy is to a man as a (?) is to a sheep.
1 wool, 2 lamb, 3 goat, 4 shepherd, 5 dog..... ()
21. One number is wrong in the following series. What should that number be? (Just write the correct number in the parentheses.)
1 6 2 6 3 6 4 6 5 6 7 6..... ()
22. Which of the five things below is most like these three: horse, pigeon, cricket?
1 stall, 2 saddle, 3 eat, 4 goat, 5 chirp..... ()
23. If the words below were rearranged to make a good sentence, with what letter would the last word of the sentence begin? (Make the letter like a printed capital.)
nuts from squirrels trees the gather..... ()
24. A man who betrays his country is called a (?)
1 thief, 2 traitor, 3 enemy, 4 coward, 5 slacker..... ()
25. Food is to the body as (?) is to an engine.
1 wheels, 2 fuel, 3 smoke, 4 motion, 5 fire..... ()
26. Which tells best just what a pitcher is?
1 a vessel from which to pour liquid, 2 something to hold milk, 3 It has a handle, 4 It goes on the table, 5 It is easily broken..... ()

Do not stop. Go on with the next page.

27. If George is older than Frank, and Frank is older than James, then George is (?) James.
1 older than, 2 younger than, 3 just as old as, 4 (cannot say which)..... ()
28. Count each 7 below that has a 5 next after it. Tell how many 7's you count.
7 5 3 0 9 7 3 7 8 5 7 4 2 1 7 5 7 3 2 4 7 0 9 3 7 5 5 7 2 3 5 7 7 5 4 7..... ()
29. If the words below were rearranged to make a good sentence, with what letter would the last word of the sentence begin? (Make the letter like a printed capital.)
leather shoes usually made are of..... ()
30. An electric light is to a candle as a motorcycle is to (?)
1 bicycle, 2 automobile, 3 wheels; 4 speed, 5 police..... ()
31. Which one of the words below would come first in the dictionary?
1 march, 2 ocean, 3 horse, 4 paint, 5 elbow, 6 night, 7 flown..... ()
32. The daughter of my mother's brother is my (?)
1 sister, 2 niece, 3 cousin, 4 aunt, 5 granddaughter..... ()
33. One number is wrong in the following series. What should that number be?
3 4 5 4 3 4 5 4 3 5..... ()
34. Which of the five things below is most like these three: boat, horse, train?
1 sail, 2 row, 3 motorcycle, 4 move, 5 track..... ()
35. If Paul is taller than Herbert and Paul is shorter than Robert, then Robert is (?) Herbert.
1 taller than, 2 shorter than, 3 just as tall as, 4 (cannot say which)..... ()
36. What is the most important reason that we use clocks?
1 to wake us up in the morning, 2 to regulate our daily lives, 3 to help us catch trains,
4 so that children will get to school on time, 5 They are ornamental..... ()
37. A coin made by an individual and meant to look like one made by the government is called(?)
1 duplicate, 2 counterfeit, 3 imitation, 4 forgery, 5 libel..... ()
38. A wire is to electricity as (?) is to gas.
1 a flame, 2 a spark, 3 hot, 4 a pipe, 5 a stove..... ()
39. If the following words were arranged in order, with what letter would the middle word begin?
Yard Inch Mile Foot Rod..... ()
40. One number is wrong in the following series. What should that number be?
5 10 15 20 25 29 35 40 45 50..... ()
41. Which word means the opposite of truth?
1 cheat, 2 rob, 3 liar, 4 ignorance, 5 falsehood..... ()
42. Order is to confusion as (?) is to war.
1 guns, 2 peace, 3 powder, 4 thunder, 5 army..... ()
43. In a foreign language, good food = Bano Naab
good water = Heto Naab
The word that means *good* begins with what letter?..... ()
44. The feeling of a man for his children is usually (?)
1 affection, 2 contempt, 3 joy, 4 pity, 5 reverence..... ()
45. Which of the five things below is most like these three: stocking, flag, sail?
1 shoe, 2 ship, 3 staff, 4 towel, 5 wash..... ()
46. A book is to information as (?) is to money.
1 paper, 2 dollars, 3 bank, 4 work, 5 gold..... ()
47. If Harry is taller than William, and William is just as tall as Charles, then Charles is (?) Harry.
1 taller than, 2 shorter than, 3 just as tall as, 4 (cannot say which)..... ()
48. If the following words were arranged in order, with what letter would the middle word begin?
Six Ten Two Eight Four..... ()
49. If the words below were rearranged to make a good sentence, with what letter would the third word of the sentence begin? (Make the letter like a printed capital.)
men high the a wall built stone..... ()
50. If the suffering of another makes us suffer also, we feel (?)
1 worse, 2 harmony, 3 sympathy, 4 love, 5 repelled..... ()
51. In a foreign language, grass = Moki
green grass = Moki Laap
The word that means *green* begins with what letter?..... ()

Do not stop. Go on with the next page.

52. If a man has walked west from his home 9 blocks and then walked east 4 blocks, how many blocks is he from his home?..... ()
53. A pitcher is to milk as (?) is to flowers.
1 stem, 2 leaves, 3 water, 4 vase, 5 roots..... ()
54. Do what this mixed-up sentence tells you to do.
sum three Write two the four and of..... ()
55. There is a saying, "Don't count your chickens before they are hatched." This means (?)
1 Don't hurry. 2 Don't be too sure of the future. 3 Haste makes waste. 4 Don't gamble..... ()
56. Which statement tells best just what a fork is?
1 a thing to carry food to the mouth, 2 It goes with a knife, 3 an instrument with prongs at the end, 4 It goes on the table, 5 It is made of silver..... ()
57. Wood is to a table as (?) is to a knife.
1 cutting, 2 chair, 3 fork, 4 steel, 5 handle..... ()
58. Do what this mixed-up sentence tells you to do.
sentence the letter Write last this in..... ()
59. Which one of the words below would come last in the dictionary?
1 alike, 2 admit, 3 amount, 4 across, 5 after, 6 amuse, 7 adult, 8 affect ()
60. There is a saying, "He that scatters thorns, let him go barefoot." This means (?)
1 Let him who causes others discomforts bear them himself also. 2 Going barefoot toughens the feet. 3 People should pick up what they scatter. 4 Don't scatter things around..... ()
61. If the following words were arranged in order, with what letter would the middle word begin?
Plaster Frame Wallpaper Lath Foundation..... ()
62. In a foreign language,
many boys = Boka Hepo
many girls = Marti Hepo
many boys and girls = Boka Ello Marti Hepo
The word that means *and* begins with what letter?..... ()
63. A statement which expresses just the opposite of that which another statement expresses is said to be a (?)
1 lie, 2 contradiction, 3 falsehood, 4 correction, 5 explanation..... ()
64. There is a saying, "Don't look a gift horse in the mouth." This means (?)
1 It is not safe to look into the mouth of a horse. 2 Although you question the value of a gift, accept it graciously. 3 Don't accept a horse as a gift. 4 You cannot judge the age of a gift horse by his teeth..... ()
65. Which one of the words below would come last in the dictionary?
1 hedge, 2 glory, 3 label, 4 green, 5 linen, 6 knife, 7 honor..... ()
66. Which statement tells best just what a watch is?
1 It ticks, 2 something to tell time, 3 a small, round object with a chain, 4 a vest-pocket-sized time-keeping instrument, 5 something with a face and hands..... ()
67. Ice is to water as water is to what?
1 land, 2 steam, 3 cold, 4 river, 5 thirst..... ()
68. Which statement tells best just what a window is?
1 something to see through, 2 a glass door, 3 a frame with a glass in it, 4 a glass opening in the wall of a house, 5 a piece of glass surrounded by wood..... ()
69. Which of the five words below is most like these three: large, red, good?
1 heavy, 2 size, 3 color, 4 apple, 5 very..... ()
70. Write the letter that follows the letter that comes next after M in the alphabet..... ()
71. One number is wrong in the following series. What should that number be?
1 2 4 8 16 24 64..... ()
72. An uncle is to an aunt as a son is to a (?)
1 brother, 2 daughter, 3 sister, 4 father, 5 girl..... ()
73. If I have a large box with 3 small boxes in it and 4 very small boxes in each of the small boxes, how many boxes are there in all?..... ()
74. One number is wrong in the following series. What should that number be?
1 2 4 5 7 8 10 11 12 14..... ()
75. There is a saying, "Don't ride a free horse to death." This means (?)
1 Don't be cruel. 2 Don't abuse a privilege. 3 Don't accept gifts. 4 Don't be reckless. ()

If you finish before the time is up, go back and make sure that every answer is right.

THE ADJUSTMENT INVENTORY

ADULT FORM

By HUGH M. BELL

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NAME	SEX	OCCUPATION
MARRIED OR SINGLE	EDUCATION (HIGH-SCHOOL GRADUATE, ETC.)	DATE

DIRECTIONS

Are you interested in knowing more about your own personality? If you will answer *honestly* and *thoughtfully* all of the questions on the pages that follow, it will be possible for you to obtain a better understanding of yourself. These questions have been carefully selected, and then given to a large number of persons. By comparing your answers with the answers of the group you will secure a more accurate notion of your own characteristics. The value of this to you will be in proportion to the care and honesty with which you answer each question.

Your answers to the questions will be treated in the strictest confidence. Therefore, feel free to give candid replies. There are no *right* or *wrong* answers. Indicate your answer to each question by drawing a circle around the "Yes," the "No," or the "?." Use the question mark *only* when you are certain that you cannot answer "Yes," or "No." There is no time limit; but work rapidly.

If you are not employed now, answer the occupational questions with reference to the last position which you held. Housewives who are not employed outside the home should omit the questions referring to working conditions.

NO.	SCORE	DESCRIPTION	REMARKS
a			
b			
c			
d			
e			

- 1a Yes No ? Does the place in which you live now in any way interfere with your obtaining the social life which you would like to enjoy?
- 2d Yes No ? Do you have ups and downs in mood without apparent cause?
- 3b Yes No ? Are you troubled occasionally by a skin disease or skin eruption such as athlete's foot, carbuncles, or boils?
- 4c Yes No ? Do you feel self-conscious when you have to ask an employer for work?
- 5e Yes No ? Do you sometimes get badly flustered and "jittery" in your present job?
- 6b Yes No ? Have you had any trouble with your heart or your kidneys or your lungs?
- 7a Yes No ? Do you feel that your present home environment allows you enough opportunity to develop your own personality?
- 8c Yes No ? Do you like to participate in festival gatherings and lively parties?
- 9e Yes No ? Do you think you made the wrong selection of your occupation?
- 10d Yes No ? Have you ever been extremely afraid of something which you knew could do you no harm?
- 11a Yes No ? Is any member of your present home very nervous?
- 12e Yes No ? Does your present work allow you time off each year for some vacation?
- 13b Yes No ? Have you ever been anemic (lacking in red blood corpuscles)?
- 14d Yes No ? Do you worry too long over humiliating experiences?
- 15c Yes No ? Do you find it difficult to start a conversation with a stranger?
- 16a Yes No ? Did you disagree with your parents about the type of occupation you should enter?
- 17c Yes No ? Does it upset you considerably to have some one ask you to speak when you have had no time to prepare your talk?
- 18d Yes No ? Does some particular useless thought keep coming into your mind to bother you?
- 19b Yes No ? Do you take cold rather easily from other people?
- 20e Yes No ? Do you think you must "play politics" to get promotion or an increase in pay in your present job?
- 21c Yes No ? Do you keep in the background on social occasions?
- 22a Yes No ? Have you had unpleasant disagreements over such matters as religion, politics, or sex with the person or persons with whom you live?
- 23d Yes No ? Do you get upset easily?
- 24b Yes No ? Do you find it necessary to watch your health carefully?
- 25a Yes No ? Has there ever been a divorce among any members of your immediate family?
- 26e Yes No ? Has your employer always treated you fairly?
- 27b Yes No ? Do you frequently come to your meals without really being hungry?
- 28d Yes No ? Are you often in a state of excitement?
- 29c Yes No ? Do you feel embarrassed if you have to ask permission to leave a group of people?
- 30e Yes No ? Do you think that you have to work too long hours on your present job?
- 31a Yes No ? Have any of the members of your present home made you unhappy by criticizing your personal appearance?
- 32c Yes No ? Do you find that you tend to have a few close friends rather than many casual acquaintances?
- 33b Yes No ? Have you had an illness from which you feel that you have not completely recovered?
- 34d Yes No ? Does criticism disturb you greatly?
- 35a Yes No ? Are you happy and contented in your present home environment?
- 36e Yes No ? Would you like to secure some other job than the one you now hold?
- 37c Yes No ? Are you often the center of favorable attention at a party?
- 38b Yes No ? Do you frequently have shooting pains in the head?
- 39d Yes No ? Are you troubled with the idea that people are watching you on the street?
- 40a Yes No ? Do you feel a lack of affection and love in your present home?
- 41e Yes No ? Do you have considerable difficulty in knowing just where you stand with your present employer?
- 42b Yes No ? Do you suffer from sinusitis or any obstruction in your breathing?
- 43d Yes No ? Are you bothered by the feeling that people are reading your thoughts?
- 44c Yes No ? Do you make friends readily?
- 45e Yes No ? Do you feel that your present employer or boss holds a personal dislike or grudge toward you?
- 46a Yes No ? Do the person or persons with whom you now live understand you and sympathize with you?
- 47d Yes No ? Do you day-dream frequently?
- 48b Yes No ? Has any illness you have had resulted in a permanent injury to your health?
- 49e Yes No ? Do you have to work on your present job with certain people whom you dislike?
- 50c Yes No ? Do you hesitate to enter a room by yourself when a group of people are sitting around talking together?
- 51a Yes No ? Do you feel that your friends have happier home environments than you?
- 52c Yes No ? Do you often hesitate to speak out in a group lest you say and do the wrong thing?
- 53b Yes No ? Do you have difficulty in getting rid of a cold?
- 54d Yes No ? Do ideas often run through your head so that you cannot sleep?

- 55a Yes No ? Does any person with whom you live now become angry at you very easily?
- 56a Yes No ? Are you getting enough pay on your present job to support those who are dependent upon you?
- 57b Yes No ? Are you troubled with too high or too low blood pressure?
- 58d Yes No ? Do you worry over possible misfortunes?
- 59c Yes No ? If you come late to a meeting would you rather stand or leave than take a front seat?
- 60e Yes No ? Is your present boss or employer an individual whom you feel you can always trust?
- 61b Yes No ? Are you subject to hay fever or asthma?
- 62a Yes No ? Are the members of your present home congenial and well-suited to each other?
- 68c Yes No ? At a reception or a tea do you seek to meet the important person present?
- 64e Yes No ? Do you feel that your employer is paying you a fair salary?
- 65d Yes No ? Are your feelings easily hurt?
- 66b Yes No ? Are you troubled much with constipation?
- 67a Yes No ? Do you dislike intensely certain people with whom you live now?
- 68c Yes No ? Are you sometimes the leader at a social affair?
- 69e Yes No ? Do you like all the people with whom you work on your present job?
- 70d Yes No ? Are you bothered by the feeling that things are not real?
- 71a Yes No ? Do you occasionally have conflicting moods of love and hate for members of your immediate family?
- 72c Yes No ? Do you feel very self-conscious in the presence of people whom you greatly admire but with whom you are not well acquainted?
- 73b Yes No ? Do you frequently experience nausea or vomiting or diarrhea?
- 74d Yes No ? Do you blush easily?
- 75a Yes No ? Have the actions of any person with whom you now live frequently caused you to feel blue and depressed?
- 76e Yes No ? Have you frequently changed jobs during the last five years?
- 77c Yes No ? Do you ever cross the street to avoid meeting somebody?
- 78b Yes No ? Are you subject to tonsillitis or other throat ailments?
- 79d Yes No ? Do you often feel self-conscious because of your personal appearance?
- 80e Yes No ? Does your present job fatigue you greatly?
- 81a Yes No ? Is the home where you live now often in a state of turmoil and dissension?
- 82d Yes No ? Do you consider yourself rather a nervous person?
- 83c Yes No ? Do you greatly enjoy social dancing?
- 84b Yes No ? Are you subject to attacks of indigestion?
- 85a Yes No ? Did either of your parents frequently find fault with your conduct when you lived with them?
- 86e Yes No ? Do you feel that you have adequate opportunities to express your own ideas in your present job?
- 87c Yes No ? Do you find it very difficult to speak in public?
- 88b Yes No ? Do you feel tired most of the time?
- 89e Yes No ? Is the pay in your present work so low that you worry lest you be unable to meet your financial obligations?
- 90d Yes No ? Are you troubled with feelings of inferiority?
- 91a Yes No ? Do the personal habits of some of the people with whom you now live irritate you?
- 92d Yes No ? Do you often feel just miserable?
- 93b Yes No ? Has it been necessary for you to have frequent medical attention?
- 94c Yes No ? Have you had a number of experiences in appearing before public gatherings?
- 95e Yes No ? Have you been able to get the promotions you desire in your present job?
- 96a Yes No ? Does any member of your present home try to dominate you?
- 97b Yes No ? Do you often feel fatigued when you get up in the morning?
- 98e Yes No ? Do any of the people with whom you work have personal habits and characteristics which irritate you?
- 99c Yes No ? When you are a guest at an important dinner do you do without something rather than ask to have it passed to you?
- 100d Yes No ? Does it frighten you to be alone in the dark?
- 101a Yes No ? Did your parents tend to supervise you too closely when you lived with them?
- 102c Yes No ? Have you found it easy to make friendly contacts with members of the opposite sex?
- 103b Yes No ? Are you considerably underweight?
- 104e Yes No ? Does your present job force you to hurry a great deal?
- 105d Yes No ? Have you ever, when you were on a high place, been afraid that you might jump off?
- 106a Yes No ? Do you find it easy to get along with the person or persons with whom you live now?
- 107c Yes No ? Do you have difficulty in starting conversation with a person to whom you have just been introduced?
- 108b Yes No ? Do you frequently have spells of dizziness?
- 109d Yes No ? Are you often sorry for the things you do?
- 110e Yes No ? Does your present employer or boss take all the credit for a piece of work which you have done yourself?

- 111a Yes No ? Do you have frequent disagreements with the individual or individuals where you live now concerning the way things are to be done about the house?
- 112d Yes No ? Do you get discouraged easily?
- 113b Yes No ? Have you had considerable illness during the last ten years?
- 114c Yes No ? Have you had experience in making plans for and directing the actions of other people such as committee chairman, leader of a group, etc.?
- 115e Yes No ? Do you feel that you are just a cog in an inhuman machine in your present job?
- 116a Yes No ? Does any person in the place you now live frequently object to the companions and friends with whom you like to associate?
- 117b Yes No ? Are you subject to attacks of influenza?
- 118e Yes No ? Does your present employer or boss praise you for work which you do well?
- 119c Yes No ? Would you feel very self-conscious if you had to volunteer an idea to start a discussion among a group of people?
- 120d Yes No ? Have you frequently been depressed because of the unkind things others have said about you?
- 121a Yes No ? Are any of the members of your present household very easily irritated?
- 122b Yes No ? Do you have many colds?
- 123d Yes No ? Are you easily frightened by lightning?
- 124c Yes No ? Are you troubled with shyness?
- 125e Yes No ? Did you enter your present job because you yourself really wanted to go into it?
- 126b Yes No ? Have you ever had a major surgical operation?
- 127a Yes No ? At home did your parents frequently object to the kind of companions you went around with?
- 128c Yes No ? Do you find it easy to ask others for help?
- 129e Yes No ? Do you get discouraged in your present work?
- 130d Yes No ? Do things often go wrong for you from no fault of your own?
- 131a Yes No ? Would you like very much to move from the place where you now live so that you might have more personal independence?
- 132c Yes No ? When you want something from a person with whom you are not very well acquainted, would you prefer to write a note or letter to the individual than go and ask him or her personally?
- 133b Yes No ? Have you ever been seriously injured in any kind of an accident?
- 134d Yes No ? Do you dread the sight of a snake?
- 135e Yes No ? Do you feel that your work is supervised by too many different bosses?
- 136b Yes No ? Have you lost considerable weight recently?
- 137a Yes No ? Does the lack of money tend to make your present home life unhappy?
- 138c Yes No ? Would it be difficult for you to give an oral report before a group of people?
- 139e Yes No ? Is your present job very monotonous?
- 140d Yes No ? Are you easily moved to tears?
- 141b Yes No ? Do you frequently feel very tired toward the end of the day?
- 142a Yes No ? When you lived with your parents did either of them frequently criticize you unjustly?
- 143d Yes No ? Does the thought of an earthquake or a fire frighten you?
- 144c Yes No ? Do you feel embarrassed when you have to enter a public assembly by yourself after everyone else has been seated?
- 145e Yes No ? Do you find that you have very little real interest in your present job?
- 146b Yes No ? Do you sometimes have difficulty getting to sleep even when there are no noises to disturb you?
- 147a Yes No ? Is there anyone at the place where you live now who insists on your obeying him or her regardless of whether or not the request is reasonable?
- 148c Yes No ? Did you ever take the lead to enliven a dull party?
- 149e Yes No ? Do you feel that your immediate superior or boss lacks sympathy and understanding in dealing with you as an employee?
- 150d Yes No ? Do you often feel lonesome even when you are with people?
- 151a Yes No ? As a youth did you ever have a strong desire to run away from home?
- 152b Yes No ? Do you have many headaches?
- 153d Yes No ? Have you ever felt that someone was hypnotizing you and making you act against your will?
- 154c Yes No ? Do you often have much difficulty in thinking of an appropriate remark to make in group conversation?
- 155e Yes No ? Do you sometimes feel that your employer does not show real appreciation of your attempts to do your job in a superior manner?
- 156b Yes No ? Have you ever had scarlet fever or diphtheria?
- 157a Yes No ? Do you sometimes feel that you have been a disappointment to your parents?
- 158c Yes No ? Do you take responsibility for introducing people at a party?
- 159e Yes No ? Do you experience a fear of losing your present job?
- 160d Yes No ? Do you frequently have spells of the blues?

THE HUMM-WADSWORTH TEMPERAMENT SCALE

—BY—

Doncaster G. Humm and Guy W. Wadsworth, Jr.

Name (print)

Time Finished:

Time Started:

Total Time:

Date Sex Age

DIRECTIONS

This set of questions has to do with the way you think. Read each question and answer it by underlining "YES" or "NO." Work as quickly as you can. Give the first answer that occurs to you in each case, and let it stand.

The SAMPLE QUESTION below shows you how to mark the questions:

(SAMPLE QUESTION) Do you like to study music?

YES NO

Now start with Question No. 1, below, and go right on through with answering the questions.

- | | | |
|---|-----|----|
| 1. Do you like to meet people and make new friends? | YES | NO |
| 2. Have you ever had to fight a tendency to become downhearted or discouraged? | YES | NO |
| 3. Do you ever have to fight against bashfulness? | YES | NO |
| 4. Do you find it difficult to maintain your opinions? | YES | NO |
| 5. Does noise readily waken you from sleep? | YES | NO |
| 6. Have your hardest battles been with yourself? | YES | NO |
| 7. Do most people make friends mainly because friends are likely to be useful? | YES | NO |
| 8. Do you find yourself at times full of energy, and at others find it hard to get going? | YES | NO |
| 9. Have you encountered some problems that are so full of possibilities that you have been unable to make up your mind about them? | YES | NO |
| 10. Would your mind work which would mean that you would be alone much of the time for long periods? | YES | NO |
| 11. When someone expresses an ignorant belief, do you try to correct him? | YES | NO |
| 12. Have you ever fainted from any cause other than heart disease? | YES | NO |
| 13. Do you sometimes have to stop and think about some step you are about to take? | YES | NO |
| 14. Have you several times been unjustly punished? | YES | NO |
| 15. Do you like a great deal of variety in your recreations? | YES | NO |
| 16. Do you frequently find yourself worrying about something? | YES | NO |
| 17. When you go to a party, are you more likely to sit by yourself, or with just one other person than to join in with the crowd? | YES | NO |
| 18. Does it take a lot of argument to convince most people of the truth? | YES | NO |
| 19. Have you ever had periods in which you were unaware of what you were doing, or what was going on about you, but in which you have carried on activity? | YES | NO |
| 20. Is it unusual for you to express strong approval or disapproval of the actions of others? | YES | NO |
| 21. When you are cornered, do you tell that portion of the truth which will do you no harm? | YES | NO |
| 22. Do you sometimes find yourself so restless you can scarcely sit still? | YES | NO |
| 23. Do you refuse to play some games because you are not skillful at them? | YES | NO |
| 24. Have you often had to take orders on work from someone who didn't know as much about it as you did? | YES | NO |
| 25. Do you have inspirations which drive you to the accomplishment of important tasks? | YES | NO |
| 26. Do you find it difficult to make allowances for people whose conduct seems wrong? | YES | NO |
| 27. When a person cannot escape dealing with another who is likely to cheat or deal sharply, is it wrong to beat the second person at his own game, with his own methods? | YES | NO |
| 28. Has more than one person called you hot-headed? | YES | NO |
| 29. When you hear a good story do you usually pass it on? | YES | NO |
| 30. Have you several times made the mistake of thinking too little of your ability to put things through? | YES | NO |

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31. Do you find it impossible to take people completely into your confidence?	YES	NO
32. Have you at times been among the last to abandon a lost cause?	YES	NO
33. Have you ever had the experience of having your mind seem to act with such great clearness and precision that even problems which have been vexing you were easily solved?	YES	NO
34. Do you like to let people know where you stand on important questions?	YES	NO
35. Do certain animals make you nervous?	YES	NO
36. Have you ever been punished because a friend has "double crossed" you?	YES	NO
37. Should a man always boost his home town against all others?	YES	NO
38. Do you like variety in your work?	YES	NO
39. Are you so made up that your feelings are more intense than those of most people you know?	YES	NO
40. Have you sometimes felt listless or tired for no particular reason?	YES	NO
41. Do you like to have the leisure to sit down and indulge in reverie?	YES	NO
42. Have you sometimes had the feeling that people were talking about you behind your back?	YES	NO
43. Have you ever been interested in strange and unusual customs?	YES	NO
44. Have you ever settled a quarrel between two or more of your personal friends?	YES	NO
45. Do you get less use than you should out of things which belong to you, because you find it difficult to take proper care of them?	YES	NO
46. Do you enjoy trying to pull the wool over people's eyes with yarns and unlikely stories?	YES	NO
47. Have you ever been snapped out of a spell in which you were feeling low, when something exciting has happened?	YES	NO
48. Do you dislike having to rush in your work?	YES	NO
49. Do you like to be where there is "something doing" all the time?	YES	NO
50. Do you find it difficult to make decisions?	YES	NO
51. Are you quite often behind the times in the gossip of the group to which you belong?	YES	NO
52. Have you received criticisms which hurt you, but which you nevertheless welcomed, because they were of real value in self-improvement?	YES	NO
53. Do you have some difficulty adding a long column of figures?	YES	NO
54. Do you think most people would be crooked if they had a chance?	YES	NO
55. Are you strongly moved by an inspirational talk or address?	YES	NO
56. Does it make you nervous to be shut up in a small room?	YES	NO
57. Have you ever had the feeling that strangers were looking at you critically?	YES	NO
58. Have you often met people who were supposed to be experts in your line of work, who really didn't know as much about the work as you did?	YES	NO
59. When someone keeps irritating you, do you have a tendency to say nothing for a long time, and then when you can stand no more "let him have it" all at once?	YES	NO
60. Are you inclined to try to win other people to your religious views?	YES	NO
61. Does your life proceed evenly and on the whole without ups and downs?	YES	NO
62. Are you quite often disappointed in other people?	YES	NO
63. As a youngster did you on several occasions play sick?	YES	NO
64. Do you get mad easily and soon get over it?	YES	NO
65. Do you often have to check up to be sure you have locked a door, put out a light, or something of the sort?	YES	NO
66. When you are disappointed in someone or something, can you explain away your disappointment, and be just as happy as you were before?	YES	NO
67. Do you sometimes hang onto an undertaking to the point that people lose patience with you?	YES	NO
68. Have you ever prevented a quarrel between your friends?	YES	NO
69. Do you avoid discussing matters on which you feel strongly in order not to say too much?	YES	NO
70. As a youngster did you have a period in which you engaged in petty thievery?	YES	NO
71. When you are feeling very happy and active, does having someone around who is feeling low hold you back?	YES	NO
72. Do you have a tendency to have not more than one confidant, and to be very close mouthed with all others?	YES	NO
73. Have you lost out in several undertakings by not making up your mind quickly enough?	YES	NO
74. Have you ever caused a quarrel between friends by something you let slip?	YES	NO
75. When you play cards do you prefer to play for money?	YES	NO
76. Do you think that the people about you fully appreciate your ability, and give you a sufficient opportunity to develop it?	YES	NO
77. Does noise bother you a great deal when you are trying to think?	YES	NO
78. Do you seem to have more than your share of aches and pains?	YES	NO

- | | | |
|--|-----|----|
| 79. Are you very much interested in books of travel? | YES | NO |
| 80. Have you at times felt called upon to pay back someone who has done you an injury, not so much for revenge, but for the principle of the thing? | YES | NO |
| 81. Did you ever go into a convulsion when you were a child? | YES | NO |
| 82. Have you at times found yourself hard put to pay for expensive things you have bought on credit? | YES | NO |
| 83. Are there several important questions upon which you have not as yet declared yourself, although most of your friends have done so? | YES | NO |
| 84. When you were in school, were you at times sent to the principal for cutting up? | YES | NO |
| 85. When you are invited out by people you do not especially like, are you apt to make up excuses for not going? | YES | NO |
| 86. Do you like to liven things up with practical jokes or witticisms? | YES | NO |
| 87. Do you frequently ask other people for advice? | YES | NO |
| 88. Do you have a day dream life which you keep to yourself? | YES | NO |
| 89. Are there certain people whom you dislike so much that you are inwardly pleased when they are catching it for something they have done? | YES | NO |
| 90. Do you spend a long time thinking out a problem before you undertake it, and then follow your plans almost to the letter? | YES | NO |
| 91. Would you be willing to overlook many faults in a friend rather than lose his friendship? | YES | NO |
| 92. When people make silly or ignorant remarks on subjects upon which you are informed, do you try to set them right? | YES | NO |
| 93. Does it make you nervous to find yourself alone in a large space? | YES | NO |
| 94. Do you think many people would tell a lie to gain advancement? | YES | NO |
| 95. Are there times when you feel especially alert, and can make up your mind much more readily than at others? | YES | NO |
| 96. Do most of the people you meet interest you? | YES | NO |
| 97. Have your plans frequently seemed so full of difficulties, that you had to abandon them? | YES | NO |
| 98. When an unpleasant situation bothers you, do you generally try to think of something more pleasant? | YES | NO |
| 99. Have you several times worked under people who seemed to have things fixed so that they would get the credit for good work, and those under them would be blamed for mistakes? | YES | NO |
| 100. Were you at some time in your life inspired to a program of advancement or duty, which you have since consistently followed? | YES | NO |
| 101. Have you found at times that you have hurt the feelings of other people, by not being careful enough of what you said or did? | YES | NO |
| 102. Does it give you satisfaction to see a crook beaten at his own game? | YES | NO |
| 103. Do your worries seem to disappear when you get with a crowd of lively friends? | YES | NO |
| 104. Do you often have to "sleep over" a matter before you decide what to do? | YES | NO |
| 105. Are you apt to hide your feelings in some things, to the point that people may offend you without knowing it? | YES | NO |
| 106. Do you find that many people are so unreasonable that it is hard to talk to them? | YES | NO |
| 107. When you engage in an undertaking, do you very patiently work out the smallest details, as well as carefully plan the larger aspects of the project? | YES | NO |
| 108. Do you have any friend whom you like in spite of the fact that he takes advantage of you? | YES | NO |
| 109. Do you feel certain in your own mind that there is only one true religion? | YES | NO |
| 110. Do you become enthusiastic over new things or new plans? | YES | NO |
| 111. If you were to find yourself in trouble along with several friends, would you agree with them that all should tell the same story? | YES | NO |
| 112. Do you find yourself at times very cheerful, and at others very "blue"? | YES | NO |
| 113. Do you find it difficult to concentrate in a room full of people, or in a place where there is a lot of talking or other noise? | YES | NO |
| 114. Do you like to know all about the people with whom you work? | YES | NO |
| 115. Do you at times see so many sides to questions, that you have difficulty in making up your mind? | YES | NO |
| 116. Have you at times, when you were not actually sick, needed to take extra rest during the day? | YES | NO |
| 117. Are you inclined to be uncomfortably self-conscious? | YES | NO |
| 118. Do you prefer to work alone, and be held solely responsible? | YES | NO |
| 119. Have you at times stood in the way of people who were trying to put something over, not because it amounted to much, but on the principle of the thing? | YES | NO |
| 120. Have your activities ever been interrupted by "blank" or unconscious periods? | YES | NO |

- | | | |
|---|-----|----|
| 121. Is it almost impossible for another person to get you into a heated argument or discussion? | YES | NO |
| 122. Does the fact that nearly everybody does some given thing, usually prove that it is a good thing to do? | YES | NO |
| 123. If you were in trouble in which several of your friends were as much at fault as you were, would you rather take the whole blame than give them away? | YES | NO |
| 124. When you get bored do you like to stir up some excitement? | YES | NO |
| 125. Have you at times worried over your health to the point that even a doctor, who has found nothing seriously wrong with you, could not reassure you? | YES | NO |
| 126. Does it make you uncomfortable to have to put on a stunt at a party even when others are doing the same? | YES | NO |
| 127. Can you see situations in a good book so clearly that it seems almost as if you were present? | YES | NO |
| 128. Have certain people deliberately stood in the way of your advancement? | YES | NO |
| 129. Have you ever walked in your sleep? | YES | NO |
| 130. Can you usually think things out in broad general terms, leaving details to take care of themselves? | YES | NO |
| 131. Do you sometimes wonder why you have bought a lot of things you have? | YES | NO |
| 132. Have you found that many people are more apt to "toe the mark" if they get a good "blowing up" every so often? | YES | NO |
| 133. Do you often times prefer to do things your own way, even when some other method is more commonly accepted? | YES | NO |
| 134. Do you think most people would sacrifice an advantage (or profit) rather than use unfair means to gain it? | YES | NO |
| 135. As a youngster did you at times get into trouble for stealing? | YES | NO |
| 136. Does it bother you to have your friends josh you in a good natured way? | YES | NO |
| 137. Have you ever lost sleep over worry? | YES | NO |
| 138. Do you prefer serious minded people? | YES | NO |
| 139. Are you apt to become impatient when someone insists on telling you how to do work with which you are familiar? | YES | NO |
| 140. Do you usually go to sleep very quickly? | YES | NO |
| 141. Would you prefer a line of work requiring much attention to detail, to one which involves a number of different activities? | YES | NO |
| 142. Is it unusual for you to express an opinion strongly? | YES | NO |
| 143. Have you at times criticized or poked fun at any religious creed, to find that someone present was a member of that creed? | YES | NO |
| 144. When things are going smoothly, are you inclined to let well enough alone, rather than to seek improved methods? | YES | NO |
| 145. Does a person usually have to have rich or powerful friends to succeed in a big way? | YES | NO |
| 146. Do you like to be with a lively bunch? | YES | NO |
| 147. Do you have hopes and aspirations which you bury in your heart? | YES | NO |
| 148. Have you often found people jealous of your good ideas, just because they had not thought of them first? | YES | NO |
| 149. Are you subject to severe sick headaches? | YES | NO |
| 150. Is it always a good thing to be frank? | YES | NO |
| 151. Do some people seem so bossy or over-bearing that they almost always make you want to do the opposite of what they ask you to do, even when they happen to be right? | YES | NO |
| 152. Have you ever done anything dangerous for the thrill of it? | YES | NO |
| 153. Do you think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others? | YES | NO |
| 154. As a youngster did you get out of tight places by pretending to be sick or hurt? | YES | NO |
| 155. Are there times when you are much more inclined to worry than at others? | YES | NO |
| 156. Were you fond of excitement as a child? | YES | NO |
| 157. Are you a good mixer? | YES | NO |
| 158. Do you sometimes have a feeling of tightness in your scalp, or in the back of your neck? | YES | NO |
| 159. When another person is unpleasing to you, are you more apt to let him severely alone than to give him a "piece of your mind?" | YES | NO |
| 160. Have people ever stolen your good ideas? | YES | NO |
| 161. Are you as willing to accept good advice on an undertaking after your plans have been completed as you are when you are working them up? | YES | NO |

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| 162. Have you at times been provoked to the point that you have said or done things for which you were afterward ashamed? | YES | NO |
| 163. Have you ever been through a period in which your nerves got the better of you? | YES | NO |
| 164. Are you inclined to go out of your way to win a point with someone who has opposed you? | YES | NO |
| 165. Do you think nearly everyone would tell a lie to keep out of trouble? | YES | NO |
| 166. Have you ever had anyone take you in so cleverly that you had to admit it was one on you? | YES | NO |
| 167. Do you find it more pleasant to work with other people than by yourself? | YES | NO |
| 168. Have you often found that people are not willing to take friendly criticism in good spirit? | YES | NO |
| 169. Do you prefer to think things through step by step, rather than to seek a broad general view of the situation? | YES | NO |
| 170. If you have liked a person from the first, are you apt to keep on liking him no matter what he may do? | YES | NO |
| 171. Do you find some religious views so absurd that you feel impelled to attack them? | YES | NO |
| 172. Do you feel greatly disturbed when you find out that opportunities you have passed up, due to caution, could easily have been carried to success? | YES | NO |
| 173. Do you object to people who are very unconventional? | YES | NO |
| 174. When you take a new job, do you like to be tipped off on whom to get on the right side of? | YES | NO |
| 175. Do you enjoy a race or game more keenly when you bet on it? | YES | NO |
| 176. Have you ever had a period of days, weeks or months in which you found yourself unable to attend to things because you could not get going? | YES | NO |
| 177. Do you sometimes feel very much alone, even when people are about you? | YES | NO |
| 178. Have you at times been misunderstood when you were trying to keep someone else from making a mistake? | YES | NO |
| 179. Have you had flashes of thought which enabled you to plan out important work to the last detail? | YES | NO |
| 180. Do you usually sleep through the night without waking? | YES | NO |
| 181. Do you have a policy of "laying your cards on the table" with people whom you wish to correct, or improve? | YES | NO |
| 182. Have you ever lost weight as a result of nervousness? | YES | NO |
| 183. Do you believe that majority rule is the best thing for society? | YES | NO |
| 184. Have you at times felt obliged to ask your friends to help you personally, even though you could not return the favor? | YES | NO |
| 185. Have you ever avoided being taken to task over something in which you knew you had been wrong by pretending to feel more sorry than you were? | YES | NO |
| 186. When you were in school did you sometimes get bad marks in deportment? | YES | NO |
| 187. Do you have periods in which your mind seems to work more slowly than usual? | YES | NO |
| 188. Does it make you nervous to be on the water? | YES | NO |
| 189. Are there very few people in whom you can confide your troubles? | YES | NO |
| 190. Have you ever purposely annoyed someone you dislike? | YES | NO |
| 191. Have you ever suffered from periodic vomiting? | YES | NO |
| 192. Do you quite often have to pass over details in your work in order to keep its important features in mind? | YES | NO |
| 193. Have you any fault which is so much a part of you that it seems better to accept it, and try to control it, than to try to do away with it? | YES | NO |
| 194. Have you at times been afraid of losing all your friends? | YES | NO |
| 195. Have you ever enjoyed beating a crook at his own game? | YES | NO |
| 196. When you were a child, did you belong to a crowd or gang that tried to stick together through thick and thin? | YES | NO |
| 197. Do you ever wear yourself out by undertaking too much? | YES | NO |
| 198. Are you apt not to give your opinion at a meeting unless you are asked for it, even when you do not like the way things are going? | YES | NO |
| 199. Do you try to figure out the reason another person may have for doing something nice to you? | YES | NO |
| 200. Have you had flashes of thought which enabled you to plan out important work with great assurance? | YES | NO |

201. Have you ever felt like "kicking yourself" over profits you might have made, or advancement you might have gained, had you been less cautious?	YES	NO
202. Do we all demand more respect for our own rights than we give those of other people?	YES	NO
203. Have you ever avoided catching it by pretending to feel sick?	YES	NO
204. Do you sometimes feel cross or grouchy without special reason?	YES	NO
205. Do you become interested in a variety of hobbies rather than sticking to one hobby for a long time?	YES	NO
206. Are you apt to take disappointments so keenly that it is difficult to get them out of your mind?	YES	NO
207. Do you ever blush?	YES	NO
208. When you lose out on a proposition you have tried to put through, do you find satisfaction in knowing you were right?	YES	NO
209. Have you had nightmares so that you disturbed other people?	YES	NO
210. Have you in mind some important project which you would like to carry out if you had an opportunity?	YES	NO
211. Have you ever worked for a long time with a person of whom you had a poor opinion, or whom you pitied, without letting him know that you felt so toward him?	YES	NO
212. Do you sometimes like to keep people guessing what you are going to do next?	YES	NO
213. Do you think most people inwardly dislike putting themselves out to help other people?	YES	NO
214. Is a man who provides temptation by leaving valuable property unprotected as much to blame for its theft as the one who steals it?	YES	NO
215. Have you sometimes discovered you were tired only when your first opportunity for rest came?	YES	NO
216. Have you ever been forced to admit to yourself that you had been worried beyond reason over something that did not matter?	YES	NO
217. Are you likely not to speak to people until they speak to you?	YES	NO
218. When you have made up your mind on a subject do you usually consider it settled?	YES	NO
219. Do you sometimes have one-sided sick headaches?	YES	NO
220. If you were to succeed equally in either case, would you prefer to carry on several important undertakings at one time, to carrying on one important undertaking after another, as each was finished?	YES	NO
221. Do you readily become one hundred per cent sold on a good idea?	YES	NO
222. Is more than one person, so far as you know, afraid of you?	YES	NO
223. Does nearly everyone place his own interests first, in spite of what he may say on the subject?	YES	NO
224. Do you like to bet?	YES	NO
225. Have you ever lost weight over worry?	YES	NO
226. Do you think there are a large number of people with unwholesome sexual morals?	YES	NO
227. When you plan things out can you see them in your mind's eye almost as clearly as if they were before you?	YES	NO
228. Do you believe that there are subjects upon which one should steadfastly maintain his opinion?	YES	NO
229. Have you found it wise to be on guard when people seem to go out of their way to be friendly?	YES	NO
230. Have you at times lost consciousness from any cause?	YES	NO
231. Do you prefer to do one thing at a time to keeping several projects going?	YES	NO
232. Have you at times felt obliged to take sides in a quarrel in a club or other organization?	YES	NO
233. Are you always on the lookout for improved ways of doing things?	YES	NO
234. Is it always best to keep your mouth shut when you are in trouble?	YES	NO
235. As a matter of fact, is nearly everyone strictly out for himself?	YES	NO
236. Does it make you nervous to have to wait?	YES	NO
237. Does it make you feel like a failure when you hear of the success of someone you know well?	YES	NO
238. Are you apt to pass by school friends, or people you know but have not seen for a long time, unless they speak to you first?	YES	NO
239. When you make up your mind about a thing do you change easily?	YES	NO
240. Have you several times had a change of heart about your life work?	YES	NO
241. Do you have a habit of counting to ten, or biting your lip or any similar habit that you use to control your temper?	YES	NO
242. Is your conduct largely controlled by the customs of those about you?	YES	NO
243. Have your own best interests ever forced you to sacrifice friendship?	YES	NO
244. Do you blame a person for taking advantage of someone who lays himself open to it?	YES	NO
245. Do you like a large crowd?	YES	NO

246. Can you understand and sympathize with the feelings of discouraged people?	YES	NO
247. Are you easily embarrassed?	YES	NO
248. Have you often found that someone was trying to take credit for your work or for your ideas?	YES	NO
249. When you have undertaken a task do you find it hard to set it aside even for a short time?	YES	NO
250. Have you been forced into a fist fight since you have been grown up?	YES	NO
251. If you had a rival in an organization in which you were working, who was just about as efficient as you are, would you feel justified in trying to secure the affection of the President to gain advancement over your rival?	YES	NO
252. Were you nearly always "on the go" as a child?	YES	NO
253. Are you reserved to the point that you sometimes find it hard to stick up for your rights?	YES	NO
254. Do you limit yourself to a very few close friends?	YES	NO
255. Do you find it necessary frequently to stand up for your convictions or beliefs?	YES	NO
256. Have you ever taken up a line of work which called for close attention to fine detail, to the exclusion of other activities?	YES	NO
257. Do you ever find yourself becoming downhearted or discouraged for no apparent reason?	YES	NO
258. Do you think most people are honest chiefly through fear of being caught in a dishonest act?	YES	NO
259. Have you often had so much to do that you found it hard to decide where to begin?	YES	NO
260. Do heights make you nervous?	YES	NO
261. Are there times when you feel more ready to be active and doing things than others?	YES	NO
262. Does it make you uncomfortable to be conspicuous?	YES	NO
263. Have several people under whom you have worked seemed afraid that you would get to know as much about the work as they did?	YES	NO
264. Do you often become so wrapped up in something you are doing that you find it difficult to turn your attention to other matters?	YES	NO
265. Have you at times been under such a strain to keep your temper that you have afterward felt ill?	YES	NO
266. When you are in trouble is it best to tell the whole story?	YES	NO
267. Do you sometimes get so excited that you find it hard to get to sleep?	YES	NO
268. Can you understand people who tend to cling to their griefs and troubles?	YES	NO
269. Do you dislike to do things which are not customary, even though they seem all right in other respects?	YES	NO
270. Do you sometimes wish people would let you alone and not pry into your personal beliefs, ambitions or problems?	YES	NO
271. Have you ever had a calm feeling of power arising out of the fact that your mind was working clearly and accurately?	YES	NO
272. Have you ever had to stop school, or work, or leave home due to nervousness?	YES	NO
273. Have you ever wanted to have enough money to follow such sports as racing, boxing and wrestling?	YES	NO
274. Do certain people "dust your feathers the wrong way," or seem to "go against the grain" nearly every time you see them?	YES	NO
275. Are you sometimes so "blue" that life seems hardly worth living?	YES	NO
276. Do you at times get up in the morning feeling tired, to find that when you get going the tiredness disappears?	YES	NO
277. Do you find it hard to make talk when you meet new people?	YES	NO
278. When you imagine anything do you picture it so clearly that it seems almost as if you were actually seeing it?	YES	NO
279. Have you found that your way of doing certain things is apt to be misunderstood?	YES	NO
280. Have you often had occasion to tell people to mind their own business where you were concerned?	YES	NO

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| 281. Do you dislike to concern yourself with details? | YES | NO |
| 282. Have you ever stayed away from another person because you feared doing or saying something you might afterward regret? | YES | NO |
| 283. Have you gone through life without nervous upsets? | YES | NO |
| 284. Have you ever been so amused at the cleverness of some crook that you hoped he would be acquitted? | YES | NO |
| 285. Have you at times felt sure that people were trying to get the better of you, although you could not prove it? | YES | NO |
| 286. Are you just as happy over something that pleases you when you must keep it to yourself as you are when you can tell your friends about it? | YES | NO |
| 287. Have you had more than your share of worry? | YES | NO |
| 288. Do you want to be by yourself when things are bothering you? | YES | NO |
| 289. When you feel in your own mind that something you want to do is right, do you mind what others may think? | YES | NO |
| 290. Do you sometimes control the actions of your friends, or of those near to you, by pretending to feel sick or hurt? | YES | NO |
| 291. Do you feel disgusted with the courts when someone accused of a crime is freed, not because he is innocent, but on the basis of a fine point of law? | YES | NO |
| 292. Do you often feel that much in life consists of making the best of a bad bargain? | YES | NO |
| 293. Have you ever felt that difficulties were piling up to such an extent that you could not overcome them? | YES | NO |
| 294. Do you greatly dislike to have people talk about you? | YES | NO |
| 295. Have you had periods in which the meaning of life has seemed indisputably clear to you? | YES | NO |
| 296. Have you several times had to "sit on" rude or annoying people? | YES | NO |
| 297. As a youngster, did you at times play hookey from school? | YES | NO |
| 298. Have you ever had anyone slip something over on you so cleverly that it tickled you? | YES | NO |
| 299. Does a snappy pep talk (on your work) make you want to try harder? | YES | NO |
| 300. Do you ever feel unworthy of your friends, or of the things they do for you? | YES | NO |
| 301. Are you apt to pass up something you want to do because nobody agrees with you as to its merits, or with your method of going about it? | YES | NO |
| 302. Have you at times been certain that people were talking about you, although you couldn't prove it? | YES | NO |
| 303. Have you sometimes felt irritable, cross or grouchy for a long time without giving any outward sign whatever, and then suddenly become unreasonably angry over some trifle? | YES | NO |
| 304. When you are busy with an important piece of work, are you impatient when you are called upon to make a decision on some other matter? | YES | NO |
| 305. When you are feeling fit as a fiddle, does it bother you to have to be with someone who is down in the mouth? | YES | NO |
| 306. Do you like to belong to lodges and clubs? | YES | NO |
| 307. Were you ever expelled from school? | YES | NO |
| 308. Have you had many fears which proved unfounded? | YES | NO |
| 309. Are you inclined to take things hard? | YES | NO |
| 310. Can you usually more than hold your own in a swap or trade of articles with other people? | YES | NO |
| 311. Do you regard yourself as being "high strung?" | YES | NO |
| 312. Do you dislike to change your plans in the midst of an undertaking? | YES | NO |
| 313. Do you like people so well that one of your greatest joys is meeting them and being with them? | YES | NO |
| 314. Have you ever felt useless—almost as if you were no good at all? | YES | NO |
| 315. Have you at times made mistakes by being overly enthusiastic? | YES | NO |
| 316. Are there some things about yourself you find it impossible to discuss with others? | YES | NO |
| 317. Do you like to be in a crowd of folks who play jokes on each other? | YES | NO |
| 318. Do you form strong likes and dislikes for people? | YES | NO |

THE HUMM-WADSWORTH TEMPERAMENT SCALE

—BY—

Doncaster G. Humm and Guy W. Wadsworth, Jr.

Name _____

Date _____ Sex _____ Age _____

PROFILE IQ _____

EXPLANATIONS	N	H	M	D	A	P	E	
VERY STRONG +3 <small>UPPER MIDDLE LOWER</small>								U M L +3
STRONG +2 <small>UPPER MIDDLE LOWER</small>								U M L +2
MODERATELY STRONG +1 <small>UPPER MIDDLE LOWER</small>								U M L +1
BORDER LINE 0 <small>UPPER MIDDLE LOWER</small>								U M L 0
MODERATELY WEAK -1 <small>UPPER MIDDLE LOWER</small>								U M L -1
WEAK -2 <small>UPPER MIDDLE LOWER</small>								U M L -2
VERY WEAK -3 <small>UPPER MIDDLE LOWER</small>								U M L -3
RAW SCORES (LOG-SCORES)								
SPACES BELOW FOR PROFILE AND REGRESSION SCORES								
CONTRIBUTION OF	N	H	M	D	A	P	E	
Components to —								NC
No Count to —								SCORER
Totals - Pr S								CHECKER
Components to —								
No Count to —								
Totals - Rg S								

REMARKS: _____

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(SCALE B)
GRAPHIC RATING REPORT ON WORKERS

Name of Employee _____ Branch _____
 Position of Employee _____ Department _____
 Employee Rated By _____ Date _____

Instructions for Making Out This Report:—Rate this employee on the basis of the work he is now doing. Before attempting to report on this employee, it is necessary to have clearly in mind the exact qualities which are to be reported on. Read the definitions very carefully. In each quality compare this employee with others in the same occupation in this company or elsewhere. Place a check (✓) somewhere on the line running from "very high" to "very low" to indicate this employee's standing in each quality. It is not necessary to put the check (✓) directly above any of the descriptive adjectives.

QUALITIES	REPORT				
I. ABILITY TO LEARN: Consider the ease with which this employee is able to learn new methods and to follow directions given him.	VERY SUPERIOR	LEARNS WITH EASE	ORDINARY	SLOW TO LEARN	DULL
	II. QUANTITY OF WORK: Consider the amount of work accomplished and the promptness with which work is completed.	UNUSUALLY HIGH OUTPUT	SATISFACTORY OUTPUT	LIMITED OUTPUT	UNSATISFACTORY OUTPUT
		III. QUALITY OF WORK: Consider the neatness and accuracy of his work and his ability constantly to turn out work that is up to standard.	HIGHEST QUALITY	GOOD QUALITY	CARELESS
	IV. INDUSTRY: Consider his energy and application to the duties of his job day in and day out.		VERY ENERGETIC	INDUSTRIOUS	INDIFFERENT
		V. INITIATIVE: Consider his success in going ahead with a job without being told every detail; his ability to make practical suggestions for doing things in a new and better way.	VERY ORIGINAL	RESOURCEFUL	OCCASIONALLY SUGGESTS
VI. CO-OPERATIVENESS: Consider his success in effectively cooperating with his co-workers and with those exercising greater authority.	HIGHLY CO-OPERATIVE		CO-OPERATIVE	DIFFICULT TO HANDLE	OBSTRUCTIONIST
	VII. KNOWLEDGE OF WORK. Consider present knowledge of job and of work related to it.	COMPLETE	WELL INFORMED	MODERATE	MEAGRE

Remarks: _____

TOTAL: _____
 FINAL RATING: _____