

PSYCHOLOGICAL TESTS IN THE STUDY OF FRONTAL LOBOTOMY

by

Nathan Greenbaum  
B.A., Brooklyn College, 1943  
M. A., Columbia University, 1945

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Advisory Committee:

Redacted Signature

Redacted Signature

Redacted Signature

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## CHAPTER I.

### Introduction.

In the earlier years of lobotomy research there had been quite general agreement that psychological tests should be an essential part of a thorough study in this area. The question was, always, can changes in personality following lobotomy be measured by psychological test studies? What are these changes? To answer the specific issues raised by some critics of lobotomy, the question was, Does lobotomy result in intellectual impairment or other "deficits" in the personality? With the ensuing years and increasing research and publication, a good deal of doubt was voiced as to the value of psychological tests in contributing to the understanding of lobotomy, and certainly in regard to their sensitivity in detecting and measuring changes. Thus, in 1946, Halstead, et al (123), had stated pointedly and unequivocally: "In no instance has a psychological test or battery of tests employed ever shown to be sensitive to frontal lobe function," Similarly, Brody (26) has concluded after testing patients pre-operatively and postoperatively with an extensive battery of tests that "the chief experimental finding from psychological viewpoint is that prefrontal lobotomy does not impair capacity to perform mental tests." He feels certain that none of the tests revealed any impairment and that the results on tests of "the Goldstein type" were also negative. In a thorough review of the

literature Kolb (1976) maintains that the only outcome of psychological test investigations was to demonstrate "the futility of attempting to define the nature of the change which occurs following lobotomy by means of standardized psychometric tests." He argues that the only way to uncover these changes is by longitudinal personality study, rather than by "overloading with psychological tests that are ineffectual for uncovering useful information as well as with other tests which apparently have been included for the obsessional hope that the researcher will miss nothing." A similar attitude is expressed in a joint paper by Kalinowsky and Scarff, a psychiatrist and a neurosurgeon, (1962), who maintain that "...the usual psychological tests give little information about...postoperative changes." Furthermore, they hold that even interviews with the patients give little of this essential information, and that only "life situations will show better than test situations that these persons do not function like normal people."

At this point, of course, one might raise the question-- why use psychological tests at all? Such an issue, though, while relevant to lobotomy is at least equally pertinent to the entire growing field of psychological tests and projective techniques, and, indeed, for any research project in which they are included. To be sure, the use of these clinical psychological techniques is still in its infancy, and the uncertainty

about their use and meaning is matched only by the uncertainty that reigns in relation to the concepts and methods of observations in the non-test clinical psychiatric practices. Yet, while these two are related, psychological testing promises some advantages that are not otherwise readily available. The basic premise for all clinical psychological testing is the one that is incorporated in the "projective hypothesis": In everything that a person does, says, thinks, and feels is reflected, -- or "projected" -- his own personality. This is, of course, equally true whether it be a psychological test or a clinical interview. The test, however, offers, in addition a measure of comparison inasmuch as it is already standardized, and also in that a more constant measuring instrument is applied than can be used in the much more unstructured interview situation. The tests, furthermore, lend themselves to logical breakdowns into categories and aspects of personality functioning for the purposes of analysis, and, conversely, when employed in a context of a consistent personality theory, can be reconstructed and organized for the purpose of synthesis and understanding the total functioning. The tests, too, are able, more directly and more accurately to reach into areas which could not be approached in the early interviews, as well as to minimize such factors as dissimulation, withholding, and conscious distortion. Too, from the tests many inferences might be drawn about the unconscious

factors which the patient could not express even if he wanted to. Certainly for the purposes of research where differences and similarities between various people are of importance, or when it is necessary to evaluate change in the same people, the use of tests is of obvious significance. Nevertheless, it cannot be refuted that many studies employing psychological tests have come out with equivocal results. However, before discarding the use of tests, it might prove of value to try to understand the reasons for the apparent failure of tests to be useful, and, if possible, to improve these conditions.

The application of psychological tests in lobotomy research is confronted with a number of limitations from the start. The most prominent and frequent one is the fact that a large percentage of the patients, -- for the very reasons that they are selected for lobotomy, -- are not amenable to psychological testing. It is true that many of those patients may improve sufficiently after surgery to permit testing, but such results are of little systematic value, in that no basis for comparisons and contrasts in the form of preoperative data is available for evaluating the postoperative tests. This fact, then, should be an important one in evaluating reports on psychological test findings in relation to lobotomy. Some investigators have attempted to overcome this limitation by comparing test findings on post-lobotomy with those of matched controls who are either psychotics or normals. While this provides

a way out, it remains by far only a second choice, since the best control, where so many variables by virtue of individual differences are introduced, remains the patient himself before the lobotomy. Another major limitation in testing psychotics even if they are testable, is that the total situation becomes too much clouded by the variables related to psychosis, so that the variable of lobotomy cannot be singled out for study. Rylander, for example, goes so far as to maintain that one cannot use psychotic patients at all for the purpose of obtaining adequate research data, and warns against using for experimentation (i.e., with tests) those who "are suffering from fluctuating or episodic psychoses." He limits himself to be obsessive-compulsive and others like him, who are in good contact, cooperative, and who give hope of reliability in their responses." One attempt to overcome this difficulty is found in the studies on lobotomy for intractable pain. Here the operation is performed on patients who are generally in good contact, are not psychotic, and present relatively good preservation, in contrast to mentally ill patients. Such a situation, it is held by some, permits evaluation of the effects of the lobotomy itself without the complication of the variables introduced by the illness. On the other hand, there is also ground for the view that maintains that intractable pain is itself, because of its magnitude and overwhelming incapacitation, a psychological illness with disrupting consequences. In addition, many instances of lobotomy for intractable pain occur in such cases as tabes, thalamic syndrome, and others where damage to the brain

or central nervous system already exists.

Another important factor to be taken into consideration when evaluating test results is the intervals following lobotomy at which the postoperative tests are done. Special care should be taken, especially, not to compare studies in which the results for one represent examination relatively soon after lobotomy with another in which the testing has been done after a greater amount of time has elapsed. It had been demonstrated (87, 211) that these changes which occur immediately postoperatively, or within about the first three months after lobotomy, are largely transient, and are not seen by the time a year or so has elapsed. These are more likely to represent the immediate effects of the injury to the brain, and while of very considerable importance in understanding the functions of the frontal lobe, are relatively peripheral to the major issue of the more permanent consequences of lobotomy. Related to this matter is the factor of follow-up. It becomes evident from the accumulated experience that the more permanent consequences of lobotomy do not become apparent until a considerable amount of time -- some say as long as three or four years -- has elapsed after the operation. All of the more improved patients, however, are likely to be out of the hospital long before such a period, while others may have been transferred to different hospitals. Unfortunately, this issue has had little attention to date, but the insurmountable difficulties inherent in it are self-evident.

The question of the influence of re-testing has been raised by a number of writers. Here, as in many other issues the opinions and convictions are contradictory. Some attempts are made to correct for this by substituting alternate forms of tests. Others disregard some test results, as, in one report, (71), the authors found that they could not use the Rorschach with regard to postoperative personality changes, because they "could not surmount...the difficulty of familiarity with the blots when shown before and after the operation." Others maintain that previous exposures to the tests do not effect re-test results, especially where the patients were psychotic preoperatively. Still others assume that some learning effect should be present in certain tasks, (as, for example, on the Porteus-Maze Test), so that it's apparent absence bespeaks the limitation in the capacity to learn from previous experiences.

The nature of the tests and batteries employed varies widely, as do their adequacy and the methods of analysis and interpretation. The range is from extremely simplified, unstandardized and insensitive techniques to elaborate, inclusive, and well-planned batteries. While the Stanford-Binet has been used to some advantage with adults, it is nevertheless surprising that it is still being used so extensively instead of the Wechsler-Bellevue which has been standardized on adults, and, which, because of its structure, lends itself much more easily to systematic research and comparative studies. Often, too, conclusions are drawn



exclusively from numerical differences between various tests, without adequate understanding of the real psychological processes represented by these numbers. Such a criticism has been forcefully made in relation to studies on abstract functioning by Goldstein (112), but it is certainly equally true for many other aspects of test applications.

Following are some brief summaries of the findings on psychological tests as reported in the literature on lobotomy. Wherever the information was available, the type of operative procedures, the diagnoses of the subjects in the study, the tests included and the intervals of testing are presented in connection with each study.

In order to simplify the scrutiny of the various studies of lobotomy which used psychological tests, the reviews are presented here in outline form. Following is a "key" to the summaries of these studies. The numbers on the following pages correspond to the numbers given here, and data following each number fall under the corresponding headings listed below.

1. Author.
2. Number of patients included in the study.
3. Diagnoses.
4. Type of neurosurgical procedure.
5. List of tests administered.
6. First post-operative interval of testing (time elapsed between the operation and the first post-op testing).
7. Findings and changes on first post-op tests.
8. Second post-op test interval (if any).
9. Findings and changes on second post-op tests.
10. Conclusions.

1. Anderson (2)
2. 1
3. Schizophrenic
4. Not specified
5. Wechsler Memory; Shipley Hartford; Bender-Gestalt; MMPI.
6. 5 days
7. No intellectual changes; no memory changes; Bender-Gestalt, no change; MMPI - improvement from earlier schizophrenic picture.
10. "It is possible that damage which would have been reflected was offset by an increase in efficiency due to a lowering of the anxiety level."

1. Ashby and Bassett (5)
2. 25
3. 10 Schizophrenic; 6 obsessional; 9 "others".
4. not given
5. The "H and B" test of art to test creative ability.  
(post-op only, but compared with 25 normal and 25  
psychotic patients)
6. Not specified.
7. A series of 23 criteria were applied in scoring the  
test. Though it was found that the lobotomized scores  
were consistently lower than the normal, it was  
considered that this was probably due to the psychosis  
rather than to the operation, since the non-lobotomized  
psychotics also had lowered scores.
10. "Creative ability is not markedly impaired by prefrontal  
lobotomy."

1. Ashby and Bassett (6)
2. 27
3. Not specified.
4. Not specified.
5. Psychogalvanic response (only 6 patients tested both pre and post; 21 matched controls for remained.)
6. Not specified.
7. Administered to see if emotional drive is lessened, by use of this relatively "objective" technique. "Little evidence that any uniform trend existed."
10. These results do not support the suggestion that lobotomy diminishes emotional drives.

1. Bassett (13)
2. 1
3. Not specified
4. Not specified
5. Multiple-choice Rorschach; standard Rorschach; "Storytelling" test; "line-drawing" test; TAT; Shipley-Hartford. (post-op only).
6. 4-6 weeks post
7. The Multiple-choice Rorschach "follows closely ... (what) we have come to expect from our leucotomized patients, indicative of poverty of association and refusal or inability to formulate anything." Shipley score "well above" any pathological level. Constriction and perseveration seen on Rorschach and on TAT.
10. Creative imagination is "much reduced and almost non-existent"; "emotional motives and associative judgments of value are not apparent; " there is some decrease in effort and application." It is not known at this time whether these changes are permanent or transient, and, if reconstitution of creative abilities do occur, on what level they would be.

1. Falconer (59)
2. 1
3. Intractable pain
4. Freeman and Watts
5. Binet; Babcock (post-operatively only).
6. 7 months
7. "deterioration of function" has set in, especially in learning new skills, but uncertain whether this is due to senility or to operation.

1. Frank (72)
2. 96
3. Psychoses of long duration
4. Freeman and Watts in some, more anterior cut in others
5. Herring; modified Binet; Matrices; Kohs-Block; Passalong; Rorschach.
6. 10 months
7. No significant differences noted. Some early impairment of "simultaneous grasp" and of "discriminative conceptual thinking", and some perseverative tendencies, but these disappeared after ten months. No intellectual deficit found, except in patients over 55. Rorschach test not evaluated, because of opinion that a bias appears on retesting by virtue of previous experience with the blots.



1. Hunt, (in Freeman and Watts, 78)
2. 40
3. Depression; Schizophrenia; Obsessive States; other neuroses.
4. Freeman and Watts
5. Kohs' Blocks; Cube Construction; Arithmetic; Paper Form Board; Cancellation; Substitution; Color Naming; Match-Stick; Coin under cup; Binet Interpretation of Pictures; Rorschach; Kent-Rosanoff; Bernreuter.
6. 2 weeks
7. "No evidence of appreciable change in general mental ability." Generally, a little more accurate, but slower; Rorschach - restricted and constricted personality before and after, but more so after - no significant variation in scores, some more extratensive tendencies; on Kent-Rosanoff (word association) - slower, fewer failures, fewer "peculiar", less perseveration, less self-reference; Bernreuter - 7 patients decrease in neurotic tendency and introversion.
8. "Several months" (7 patients)
9. Some improvement over first post-op and over pre-op; loss of speed now recovered.
10. Results demonstrate that "even within two weeks after operation the intelligence as measured by standard tests is not impaired and that although there may be some slowing up in the response, there is, in general, better attention, greater accuracy, fewer peculiarities, and a greater tendency towards objectivity. With the passage of time even the speed picks up, and patients no longer hampered by their inward-driving thoughts, and accompanying fears, anxieties, apprehensions, and so on, can go outward into their fields or rational endeavor, their intellect unharmed, their emotions under control. Some of them at least can accomplish more work with less strain and less fatigue...with almost quantitative exactness - there is no impairment of the intelligence following frontal lobotomy."

1. Freudenberg (98)
2. 24
3. Not specified
4. Psychosis
5. Memory for objects; paired associates; verbal similarities; sorting tests; Reitman's Pinman test; Kohs' Blocks; Bender Gestalt. (No pre-op tests but matched with 24 non-lobotomized patients).
6. Not specified.
7. Impaired intellectual functioning; diminished punctiliousness; diminished capacity to analyze and reproduce unfamiliar spatial relations; diminished capacity to form linkages in unfamiliar verbal material; do not shift as well (sorting and Kohs Blocks).
10. Some of the changes are based on the fact that the patients are not trying as hard and could not focus their attention as well and as persistently, i.e., in their capacity to maintain a set. Concludes that lobotomy does result in intellectual impairment.

1. Greenblatt (119)
2. 42
3. Cover "all chronic psychiatric illness", mostly schizophrenic.
4. Varied cuts, not specified for psychological test results.
5. Rorschach; Goldstein Block Design; Kohs' sorting; Weigl Color Form Sorting; Shipley-Hartford.
6. 3 weeks to 2 months
7. "Slight impairment" noticed on abstraction tests, being more concrete and poorer in abstraction; on Block-Design, more indecisive, required more effort; nearly all had difficulty in shifting on Weigl; on Shipley, no effort exerted; on Rorschach, - "much more perseveration, more stereotypy, and less fantasy or creative imagination." Reduction of spontaneity and initiative, but "freer emotional expression", and some interference with judgment. "No consistent trends as to presence or absence of anxiety was noted."
8. 2 years "or more". (9 patients)
9. 2 improved over earlier abstraction tests, but not up to pre-operative level. Of the nine, one was better, one was the same, and the rest were "worse than shortly after the operation".
10. "Most consistent impressive change was that in attitude; practically all patients after the operation presented only superficial cooperation and effort, a rather care-free and unconcerned approach to the tests."

1. Halstead (121)
2. 8
3. Not given
4. Not given
5. Halstead Impairment Index Battery
6. 42 to 90 days
7. No changes as compare with lobectomies.
8. "In some instances" follow-up for "about 3 years."
9. No change in impairment index.
10. The reason for no changes in these patients as compared with lobectomies is that lobotomy is essentially a subcortical procedure, not effecting the cytoarchitectural areas of the cortex.

1. Hunt (144)
2. Not specified
3. Not specified
4. Not specified
5. Wechsler-Bellevue
6. Not specified
7. Consistent drop in general intelligence on W-B. "Significant" reduction on vocabulary, with a greater concreteness in definition post-operatively.
10. "Balance of evidence ... (seen) in terms of a reduction in ability to maintain a set in the face of interference." Individual differences in amount of deficit could not be correlated with any specific factors, such as extent and location of cut, although one psychological factor which did appear to play a major role in producing individual differences was that of the patient's "interests".

1. Hutton (153)
2. Not specified
3. Not specified
4. Not specified
5. Rorschach
6. Not specified
7. Lobotomized patients show no enthusiasm and "make no great effort"; their answers are quick, brief, conventional, and evoked by large obvious details. Post-op responses "are mere repetitions, rather more accurately described and with the more bizarre details omitted," as compared with the pre-op Rorschachs. New human responses are infrequent.
10. Despite the fact that it is believed that repeating the Rorschach introduces a memory factor which "to some extent minimizes the validity" of the later interpretations, it is concluded that lobotomized patients show less originality than "normal people" of comparative background, and that a definite diminution of creative activity is observed post-operatively.

1. Kisker (171)
2. Not available
3. Psychotic patients
4. Not available
5. Luria tremograph; Bender-Gestalt
6. Not available
7. No evidence of impairment in motor organization.
10. In regard to "psychomotor patterns", found that clinically improved group changed in motor organization in direction of more stable and symmetrical responses. No indication that any motor phenomena are impaired by lobotomy.

1. Kisker (172)
2. Psychotics
3. 20
4. Not available
5. Rorschach
6. "Whenever conditions permitted."
7. Some of the records definitely reflect improvement while others don't. Finds "signs" which he considers related to brain damage: low F%; low R; extended reaction time; absence of M. C, and Z responses
10. Post-lobotomy patterns do not seem to be very much different from the Pre-lobotomy patterns. When some of the organic signs do appear in the Post-lobotomy pictures, it is found that these are present also in the pre-operative picture, raising the question as to how much of the present picture is due to the actual post-operative lobotomy condition, and how much of it is a residue of the longer psychotic personality. Actually, Rorschach improvement may, or may not, run parallel with clinical improvement. Finally, he concludes, that in general it appears that the Neurosurgical transection of the frontal association areas play a less important role in the reorganization of the Rorschach patterns than does the pre-psychotic and pre-operative personality structure."



1. Kisker (173)
2. Psychotics
3. Not available
4. Not available
5. Kohs' Blocks; modification of Weigl-Goldstein-Scheerer Sorting Test; test of grouping behavior as suggested by Vigotsky and Halstead; Rorschach.
6. Not specified.
10. Concludes that "it is apparent that all patients do not show impairment or deterioration of abstract thinking following frontal lobectomy." He raises the question whether the observation of the Post-operative impairment and abstract functioning may not actually be a residual of the pre-operative psychotic structure, which is actually suggested by the facts that two patients who did not show pre-operative impairment of these abstract functions failed to show impairment on the post-operative examination.

1. Koskoff (177)
2. 10.
3. Intractable pain
4. Not given
5. Wechsler-Bellevue; Porteus; Babcock; Terman Vocabulary
6. 3 months
7. On one patient: Loss in all abilities on Babcock, though there was recovery with time: W-B, - loss of 38 points after 19 days, and at 3 months post-op it was still down 23 points.  
For total group: Of 4 who were given Terman, 2 showed no change, and 2 had slight losses. On Babcock (5 patients), 1 showed general improvement, one little change, and 3 a general loss. On W-B (5 patients), average decline of total I.Q. was 20.4 points; Verbal I.Q. down 16.1 points; Performance I.Q. down 7.9 points. On Porteus (3 patients), all showed decline, average 4.1 years. Only one patient showed improvement on tests, and this was one suffering from agitated depression accompanied by idiopathic pain.
10. Improvement in the one patient who also had depression is attributed to fact that he already had impairment in functioning pre-operatively. In others, intellectual functioning is generally impaired, not being limited to specific abilities such as planning or abstract functioning. However, it appears that there is a gradual return of intellectual capacities.

1. McCullough (198)
2. 10
3. Schizophrenia
4. Not specified
5. Wechsler-Bellevue
- 6.. 2 weeks
7. Results not discussed for this test interval
8. 8 weeks
9. IQ scores remain stable; Vocabulary, Information, and Comprehension not affected; Improvement seen in Digit Span, Picture Arrangement, Block Design.
10. After operation, less preoccupation and internalization of energies; Picture Arrangement improvement signifies improvement in attention and concentration; Block Design improvement is associated with relief from emotional tension and depression.

1. Malmö (205)
2. 15
3. "Chiefly neurotics in excellent contact"
4. 7 frontal gyrectomy; 8 frontal lobotomy
5. Wechsler-Bellevue, Forms I and II; Stanford-Binet Vocabulary; Homograph; Hebb Fourth-Word Series; Carr Vocabulary Manipulation; Hunt-Minnesota; Wechsler Memory, Forms I and II; Worcester-Wells Memory Test; Memory Span for Objects; Cameron Counting Test; Progressive Matrices; Shipley-Hartford; Halstead Sorting; Porteus Maze; Downey Tests of Will-Temperament; Color Naming; Bender Gestalt; Kent-Shakow Clinical Form Board; Goldstein-Scheerer Cube and Stick; Mosaic; Rorschach; and some unstandardized procedures.
6. Varying intervals with different patients, ranging from one day on.
7. Because of the complexity of the study, results are presented under the following headings:  
**GENERAL INTELLIGENCE:** All IQ's (7 patients who received Form I of W-B pre, and Form II post) were lower after operation, ranging from decreases of 1 to 16 points, with average loss of 8.3 points, significant below the 5% level of confidence. On the Binet Vocabulary, the lobotomy patients showed more consistent losses than the gyrectomies. On the Capps Homograph (requiring the patient to shift his attitude or set by giving different meanings for the same word), there was a definite reduction in score. Compared with other studies of intellectual impairment with organic brain damage, it was concluded that the data show "very clearly" that intellectual impairment following operation is "definite but slight."  
**LEARNING:** In trying to learn 8-unit lists of nonsense syllables, at varying intervals post-operatively, it was concluded that "ability to learn nonsense syllables in series by the rote method appeared to suffer after operation, requiring more time to learn after the operation than before, despite the additional practice."  
**MEMORY:** No loss on Wechsler-Memory, but some reduction on Hunt-Minnesota. Factor of speed probably accounts for decrease on Hunt-Minnesota; Negative results on digit span test, sentence span test, picture recognition, reproduction of abstract figures, and Halstead memory

for objects test.

**ABSTRACT THINKING:** On Vocabulary, definitely more concrete definitions post. Also impairment on Block Design, and, in the case of two patients, loss in categorical attitude on Halstead sorting test.

**PLANFULNESS:** 5 of the 7 lobotomy patients lost points on the Porteus, though two gained slightly.

**DELIBERATION:** Less time required on the Progressive Matrices, indicating confirmation of Robinson's hypothesis that deliberation is reduced after lobotomy; but no confirmation for Robinson's test of deliberation.

**STRESS TESTS:** Increased responsiveness to external stimulation on Hardy-Wolff Pain Threshold Apparatus; on mirror-drawing test, - a measurement of manual control in a stressful situation not involving pain, found "no significant reduction in manual disturbance post operatively."

**CONCLUSIONS:** Evidence is strong that frontal lobe operations lead to "definite loss in general intelligence." However, although all patients showed some loss in general ability, the loss was not the same in all patients, and could possibly vary in a single patient from one aspect of test behavior to another. An attempt is made to explain these individual differences in terms of such factors as amount of brain tissue removed, location of removal, degree of dysfunction, and in terms of outstanding psychological characteristics of the patient. In regard to the first factor, there is very little correlation found in respect

to amount of brain tissue removed. As to location of removal there are suggestion that a posterior removal might be more impairing than an anterior one, though this is by no means consistent. The third factor did not seem to yield any definite tendencies, while the fourth factor, patient's interest, does seem to be quite relevant. Summatively, on the basis of the evidence from human and animal investigation, the function of the frontal lobe is formulated as follows: "The frontal association areas are concerned with the ability to adopt a set toward a goal, or an attitude of expectancy, and to maintain such set or attitude in the face of interference until the expectancy is confirmed or denied, or until the goal is reached or abandoned."

Clinical improvement in patients who had undergone lobotomy is interpreted in terms of reduced "tendency to maintain a set." Thus, anxiety is seen as an anticipation or an expectancy of unspecified, unfavorable events to come in the future; obsessions are viewed as

mental sets, compulsions as motor sets; in the case of intractable pain, the set is in relation to persistent internal painful stimulations. These sets, by virtue of lobotomy, are interfered with by the current stimulations and activities, since "stimuli and activities of the present have greater potency than internally produced stimuli from sets and expectancies."

1. Mettler (Greystone Project). (211).
  2. 24 lobotomy; 24 control.
  3. Schizophrenia.
  4. 24 variations of topectomy.
  5. A total of 35 tests, standardized and unstandardized, were used. These will be discussed under separate headings.
  6. 3 weeks, and 3 months.
  7. **INTELLECTUAL FUNCTION.** Wechsler-Bellevue; Porteus Mazes; Continuous Problem task. No significant differences on W-B, except that the control group improved more on the Object Assembly and Digit Symbol than did the operatees. Statistically significant results occurred on the Porteus, finding definite impairment in the operatees after the lobotomy, at the first re-test, but did not continue at the second re-test. On the Continuous Problems, there were not any significant differences, except that the control group showed "better" performance" in terms of problems solved and fewer errors made. Conclusion is that "with regard to a total picture of intellectual function ... no alteration which can be regarded as permanent" was found, and that there was no indication that the excision of any one area influence the intellectual functions permanently any more than any other, or that the amount of tissue removed exerted any "differential effect." "It would appear that the frontal lobes do not play a very active role in measurable intelligence, and interference with their function, ... has no permanent repercussions in tasks requiring intellectual ability." Nevertheless, certain trends did appear. One, while the control group consistently gained in score in re-testing, the operatee group did not, suggesting that the latter "were not able to profit from its previous experience with the test to as great an extent as were the controls."
- LEARNING AND RETENTION:** A wide variety of types of learning was studied, ranging from material free of previous association to material high in associative value, and from isolated words to continuous passages. For all of these, learning, recall, recognition, and re-learning procedures were applied. No significant changes were found, nor "any impairment ... which could be attributed to the operation per se, or to any of the associated variables which we have considered."

ABILITY TO ABSTRACT. Modified Object Sorting, requiring active, and passive sorting, as well as "recall"; Weigl Color Form Test; "Essential Differences" test; "Analogies" test. Results found were that not only were there no indications of impairment in the "abstract attitude", there were also tendencies for both groups to increase. Conclude that they doubt that "there is a general factor of abstract behavior in the rather inclusive way in which Goldstein described it. .. Our findings of loss of ability to shift (Weigl Test) associated with ablation of area 46, and grouping restriction associated with ablation of area 9, indicate that the clinical observation which Goldstein made does occur with a certain limited regularity. Goldstein generalized too far from isolated observations."

WORD ASSOCIATION TESTS: Three lists of stimulus words. No significant differences were found, except for the "clangs" in which the operated group exceeded the control. Changes on t is test went along with improvement. Conclude that "removal of brain tissue from the frontal lobes of man did prouce" some changes on the Word Association, mainly such which reflected improvement in emotional and social adjustment.

TIME JUDGMENT: With use of stop-watch, three types of time judgment tasks; reproduction, verbal estimation, and operative estimation. No significant change found.

CRITICAL FLICKER FREQUENCY: Not all of the operated patients showed alterations in CFF, but those that had high CFF pre-operatively showed a decrease post. "The meaning or significance of our findings is not clear. Further investigation must be conducted before we will be able to assess the meaning of t is tendency for a decrease in CFF to follow brain operation."

AFFECTIVITY: An "Anxiety inventory"; a "complain inventory"; "mirro-drawing experiment". The findings are that "bi-lateral removal of Brodmann's are 9, 10, and 46 in patients who were over 40 years of age, who had I.Q.'s of over 105, and in whom there was free verbal expression of anxiety in complaints of mental troubles, resulted in the decrease of anxiety, which decrease was associated with social improvement or recovery from mental illness. This change is one of affective stabilization which results in a loss of psychomotor tension and of the painful preoccupation and self-centered concern with present and past personal problems, thus allowing the patient to react more readily to his environment."

THE RORSCHACH TEST: No attempt was made to systematically treat Rorschach data in a statistical way. Summarizing



the findings, it was found that some of the operated patients "have been altered in their personality trends while others remained unchanged. No definite pattern of changes emerged. Furthermore, the control patients frequently showed the same types of changes observed in the operative group." In the statistical analysis that was attempted, it was found that the most pronounced change occurred on reaction time, the operatees showing a greater decline. There were also some other tendencies, the factors tending to show a decrease being those associated with anxiety, ambitiousness, conflict, introspection. Factors showing increase were those related to lessening of ambition and lowering of standards of accuracy.

**OTHER TESTS:** Tests in 4 categories: immediate memory, visual perception; sustained attention; and a group of concept formation tests. No impairment in immediate memory as seen on the Benton Visual Retention test. On Eisenson Aphasia and on Harris' test of Lateral dominance, there were no indications of any aphasic phenomena. On Levy Movement Cards, both operatee and control groups tended to benefit some from practice, although operatee group benefitted more. On Rubin (reversible) Figures, it was found that "although no group differences were found there was a definite difference in the acceptability of demonstration in favor of the operative group. On the Bolles Progressive Completion test, a test of perceptual closure, no differences were found at any time. On the Capps Homograph Test, it was concluded that "the topectomy operation interfered with verbal flexibility on this test, and that the operation in which areas 45 and 46 are involved were productive of the greatest interferences. On a series of jokes and humorous cartoons which the patients had to rate for goodness, no consistent results were found.

**FOLLOW-UP TESTING:** Those tests which earlier yielded some significant changes were re-administered a year after the operation. These included the Porteus, Weigl, Capps and CFF. None of the changes seen earlier "resulted in a permanent loss." The changes were, more often than not, associated with an amelioration from psychosis and social recovery. Anxiety diminished clearly and consistently in the course of the first post-operative year, and complaints dropped sharply immediately after the operation and remained at a new low level.

**SUMMARY OF TOTAL STUDY:** On the basis of all of the test results it would seem that no general factor of mental operation was significantly altered. The factors of intelligence, speed, power, memory, attention, ability to

abstract, verbal facility, or imagination were not altered by a general decrease or increase. The changes which did take place were in rather specific performances which were, so far as we could tell, interrelated principally in that they were associated with social recovery. However, the following definite statements could be made; 1) That the immediate losses following operation were partly regained in time; 2) As to the variations with the different areas excised, it was found that the gains at the second post-operative retest are greatest with area ten and smallest with area eleven; 3) That the losses at the first post-operative retest are most marked with area six, eight, nine and forty-six, and least with area eleven. At the second retest the losses have stabilized and are usually slightly more than are the gains. Area six has the most loss and area eleven the least; 4) It was found that the patients who made good social improvements had more gains and fewer losses at both post-operative retests than those who improved slightly or who failed to improve. This is most marked at the second post-operative retest in that good social improvement had twice as many gains or losses as did those patients who failed to improve. The final conclusion is that "psychological and psychometric changes do take place in patients in whom there has been a bilateral symmetrical removal of specified anatomical areas from the frontal lobes. These changes are relatively independent of such background variables as age, intellect, sex, or years of hospitalization. However, no patient in this group of nineteen operatees which we have studied had a real or permanent impairment of mental function brought about by the operation, which could be demonstrated in any way by our exhaustive psychological test battery. In individual patients, specific losses in the form of marked decreases in scores did occur, but these losses were, so far as we could tell, more than compensated for by other marked gains and hence did not lead to impairment." While there was no real loss in memory, learning, or intellectual functions, "there was a real valid gain in some recall or recognition of memory scores of many of the patients, which gain was usually associated with the social recovery of the patient".

1. Mixter (221)
2. 2
3. Chronic agitated depression
4. Not given
5. "Informal tests"; Otis; Rorschach; Army Alpha.
6. 6 weeks
7. Little difference from pre, though less alert and slower; recent memory and serial subtraction good.
8. 5 months
9. Otis - considered to represent drop from pre-op capacity. Rorschach - "mental torpidity, absence of imagination or drive"; some perseveration, low Popular.

(Third post-op): About one year  
Army Alpha showed no change from Otis; did well on simple tasks but not as well on more complex tasks; Rorschach - similar to previous Rorschach, with even more depression. He did not remember his previous responses, which "might be due to faulty memory".

1. Oltman (232)
2. 31
3. Chronic schizophrenia
4. Not given
5. Wechsler-Bellevue.
6. 6 months
7. Average increase of 10 points on W-B.
8. 12 months (the group was "somewhat smaller").
9. 12 point increase on W-B.
10. This does not represent actual increase in intelligence, but "is indicative of more efficient intellectual functioning." Also take issue with those who maintain that lobotomy patients are "reduced to a vegetative state," in view of their finding that there is no reduction in intelligence.

1. Petrie (240)
2. 20
3. "Depressed, anxious obsessional or paranoid."
4. Not specified
5. Wechsler-Bellevue; Porteus; Proverbs from Binet; "some objective measures of temperament, such as persistence, speed-accuracy and suggestibility" and tests of "neuroticism" and "introversion-extraversion".
6. 2 to 3 months
7. "Significant" drop in I.Q. of about 5 points, primarily because of decrease on verbal subtests; less capacity for generalization" on Proverbs; loss on Porteus; decrease in "neuroticism". After lobotomy the patient is seen as "a person in whom neuroticism is less marked, especially as shown by a decrease in suggestibility, a smoother work curve, and his attitude towards himself. There is marked decrease in the traits characterizing the anxious, depressive, introverted type. He goes for more speed and less for accuracy. He is less persistent in a situation requiring endurance. He blames himself less for the fewer undesirable traits he still ascribes to himself now regarding these as inevitable. He lives less in the past, more in the present, and in the future. He has lower motor perseveration scores, and the goals he sets himself and his judgment of his performance are closer to reality. He has dropped on verbal intelligence scores, and on tests where impulsiveness is penalized. Learning is more difficult, but routine tasks once learned are easier. He is also somewhat less distractible."
8. 9 months (241; same tests, same patients.)
9. Continued loss of verbal ability on W-B, although the performance level goes up, mainly due to increase in Digit Symbol. Loss in comprehension is especially significant, and attributed to change in attitude towards the social environment. The greater loss on verbal scores is attributed to impairment of abstract functioning and tendency to a more concrete performance. The early loss on Porteus Mazes was regained. Still difficulty in generalization as seen on Proverbs "Neuroticism" continued to decrease, as well as consistent tendency for diminished introversion, as seen earlier.

10. Because all of these changes occurred already at the 3-month testing interval, and were still present 9-months post-operatively, it is concluded that these changes are permanent consequences of lobotomy.

1. Porteus (249)
2. 55.
3. Chronic psychoses
4. Not specified
5. Porteus Maze
6. Varying intervals, from 6 to 52 weeks
7. Definite decline in maze performance after lobotomy, decreasing with time. They profit much less from practice than do non-lobotomized patients. Improvement in maze performance goes along with improvement in condition.
10. "Maze test is very significantly sensitive to changes in intelligence following lobotomy."

1. Robinson (266)
2. 16
3. Schizophrenic
4. Not given
5. Rorschach; Seguin-Goddard Form Board; Stanford-Binet; Weigl; Shipley Hartford; Hunt-Minnesota; Porteus. (post-op only, 7 controls used)
6. 7 months
7. On Rorschach, these patients were "fairly representative of lobotomized individuals". Mean percentages are given. On Binet - no falling off in intelligence. No difficulty on Weigl or Shipley-Hartford; learning and retroactive inhibition not interfered by lobotomy; Only 2 patients were given Porteus Maze, so definite conclusions not available.
10. Maintains that the real difficulty lobotomy patients have is in "deliberativeness, which is "the capacity for attention; and for maintaining and prolonging an ideational pattern against distraction. New tests are devised to measure this function, and concludes that it is the interference with this function by lobotomy which accounts for the improvement.



1. Robinson (267)
2. 68
3. Not given
4. Freeman and Watts
5. Binet Vocabulary; Porteus; Deliberation Test; "Self-regarding span"; a "Sensibility Questionnaire"; (No pre-op tests were given, but post-lobotomy patients were compared with a matched group.)
6. Not given
7. No differences on Vocabulary; Porteus and Deliberation tests were significantly more impaired, but these reveal only "incidental effects of surgical intervention". Introduced new tests to get at more basic changes.
10. Lobotomy "prevents development of future tensions by reducing individual's awareness of his own self-continuity."

1. Rylander (274)
2. 8
3. 2 obsessive-compulsive; 1 hysterical psychopath with anxiety periods; 1 sensitive psychopath with periods of depression; 1 anxiety with hysterical fits; 1 hypochondriacal paranoid state; 1 phantom limb pain; 1 hypochondriacal state.
4. Freeman and Watts
5. Serial Subtraction; addition test; memory tests; free association; proverbs and fables; Rothman's sorting test. (only 6 patients were tested also pre-operatively).
6. 7 weeks to 27 months
7. Concentration restored after one month; rate of intellectual work not up to pre-op standards; no impairment in memory; "definite and considerable" reduction post in the 3-minute free association test; Proverbs and fables were more concrete, showed difficulties in generalizing; on Sorting, difficulty in finding sorting principles. IQ's are somewhat lower, small differences, but loss in each case. Qualitative analysis shows that those items which required abstract functioning were "not answered well."
10. Maintains that it is of utmost importance for comparative re-test studies to select only those who "are test-reliable, who really can make use of their maximal intellectual capacity when teste." For this purpose he considers people with obsessive ideas as the best subjects.

1. Strom-Olsen (305)
2. 11.
3. Schizophrenia; involuntional melancholia; mania; depression; epilepsy.
4. Crombie technique (5); Freeman and Watts (1); combined (5).
5. Terman Vocabulary; Stanford-Binet; "discrepancy test" modification of Babcock's scale; Koh's Blocks; Porteus Maze; Passalong; Progressive Matrices; Shipley-Hartford.
6. 6 weeks
7. Patient operated by Freeman technique showed "pronounced fall in the discrepancy test, ...increase in time consumed on vocabulary and matrices, and a large fall in number of items attempted on Shipley-Hartford. In the combined group only one showed definite change. His mental age on the S-B dropped from 18 to 12-7; loss also on Porteus and matrices. Some perseveration and impaired conceptualization, slowing up, and, on Binet, greatest defects were in "sustained associative thought, conceptual thinking, and immediate learning." The 5 Crombie patients showed no defects at all.
8. 4 months
9. The Freeman patient attained his pre-operative level; in the "combined" patient most of the deficits were improved.
10. The early changes are due to lethargy and lack of spontaneity, and "extreme inhibition and vacillation." The Freeman technique,  $\frac{1}{2}$  inch posteriorly, tends to produce lethargy, while the other techniques do not. No relationships were found between test performance and abnormal EEG.

1. Van Waters (311)
2. 1
3. Schizophrenia
4. Not specified
5. Rorschach (post-operatively only)
6. 9 months
7. Still clearly schizophrenic no primary evidence of organicity; this picture is not consistent with the clinic observations, where the schizophrenic manifestations are not seen.
10. The psychotic feature remain more dominant than the lobotomy or "organic" elements, and it is necessary to evaluate pre and post pictures, as well as "extramural adjustment" to understand the total situation and the changes.

1. Worchel and Lysterly (331)
2. 10
3. Depression
4. Lysterly technique (direct visual)
5. Stanford Binet (only 5 of these 10 patients were tested preoperatively)
6. Not specified.
7. Of the 5 patients tested pre: no change seen; for total group - all had "deteriorated to a greater or lesser extent", but not apparent if this due to psychosis or to lobotomy. Marked difficulty on the free-association test from Binet.
10. Any deterioration that may be present is not due to the lobotomy. Recognize difficulties inherent in testing psychotic patients, because "the individual's capacities and abilities may not be reliably determined by the psychometric examination. Lack of cooperation, whether of psychological or physiological origin, malingering, interfering mental trends, will impair validity of the psychometric results. However, they do not believe that any distortion is introduced by re-testing, because "the inability of the patients to discuss the examination with anyone, the psychotic condition, and the fact that a surgical operation followed the psychological examination, all tended to eliminate the practice effect due to a retest".

1. Yacorzynski (334)
2. 1
3. Suicidal and Schizophrenic
4. Not specified.
5. Twenty-one different tests were given. These will be discussed below under different headings.
6. 3 months
7. Frontal lobe functions: Abiguous figures; perception of visual illusions; figure-ground fluctuations. No indication that this patient showed any organic changes similar to that found in patients with frontal lobe lesions.  
Motivation: Levels of aspiration test; degree of effort test; TAT. Patient showed consistently high level of aspiration before and after, but exerts minimum effort. No change in motivational factors as seen on TAT.  
Personality: Rorschach and MMPI. On Rorschach - decrease in R, P, and form level percentage. Tendencies to confabulation and contamination are greater. MMPI - the wide divergence seen pre and the pathological scores no longer present; the pattern post-lobotomy is like what would be expected of the average population.  
Intelligence: Wechsler-Bellevue and Stanford-Binet. W-B - decrease of 17 IQ points, with greater decrease on verbal scale; except for Similarities and Picture Completion, all subtests suffer, with greatest decrease on arithmetic; Picture Arrangement and Block Design affected less than others. S-B - IQ down 21 points; items suffering most are those dealing with perception of logical relationships.  
Reasoning, concept formation and perceptual responses: Color-form blocks; Vigotsky; Goldstein-Scheerer Block Design; object sorting. Decreased efficiency on color-form and Vigotsky, with perseveration; slight impairment on Goldstein-Scheerer Blocks; no change on object sorting. Though reasoning was in general greatly reduced, it was only on "items which required the patient to use concepts which did not deal with his immediate environment. He could reproduce complex patterns well, and slightly better following operation in applying concepts to situations with which he was acquainted."
10. Above results suggest following: 1) That the abstract

(Yacorzynski, continued).

thinking affected by lobotomy is a function of the connections of the cerebral cortex with other areas of the brain. This may account for the contradictory reports on the effect of lobectomies in the field of reasoning. If the lobectomy involves the same pathways destroyed in a lobotomy, then reasoning is affected. Otherwise it may remain unchanged. 2) That the lack of motivation as shown by lack of initiative and planning for the future following a lobotomy may be due not to any motivational changes, but to the inability to grasp complex relationships. The patient does not plan for the future because he is unable to see the necessary relationships for such planning. 3) That if the patient is in good contact with his environment then certain functions as measured objectively either remain unchanged following the lobotomy or change in the less beneficial direction. The improvement reported on many lobotomy patients may be due to clinical impressions based on the reports of the patient and to the patient's post-operative adjustment rather than to the actual evaluation of the functions that are involved. The possibility exists that in very disturbed patients the mental status is improved by the lobotomy. This may still imply that certain functions which were present in the patient's healthy mental condition were affected.

1. Hebb (341). (Based on a personal communication from H. E. Rosvold).
2. 7
3. Psychosis
4. Not given
5. Wechsler-Bellevue (Also, "premorbid measures of intelligence made in Canadian Army.").
6. Not given
7. Wechsler-Bellevue showed no change in intelligence after lobotomy, but when army classification test scores were converted to W-B scores, the estimated premorbid intelligence was found to have dropped by 19 points.
10. "There can be little doubt that lobotomy in a normal brain would induce serious defects of problem solving, and equally little doubt that the operation does not restore the original level of intellectual function in the psychotic patient."



H.P.

The Patient, born in 1900, is a white male, who completed nine grades in school. He enlisted in the Army at the age of 17, and was subsequently occupied as a cook, waiter, or restaurant owner. He was married in 1919, and widowed five years later. He had made a fairly good economic and social adjustment, although he mixed very little socially, and was generally restricted and constricted in his interests and activities. His physical condition was good until June of 1947 when he first noticed the onset of numbness on the left side of his face which rapidly extended to his left arm and the rest of the left side of his body. This was accompanied by a generalized weakness. Because of the severe pain, the patient was transferred to this hospital from the Wichita V. A. Hospital, in November of 1947, for neurosurgical consideration of intractable pain and hyperesthesia, left side of body. The diagnosis of thrombosis of the right thalamo-geniculate artery due to unspecified cause and resulting in partial hemiplegia and hyperesthesia on the left side of the body was made.

After extensive work-up here, a prefrontal lobotomy was performed in February of 1948. The oper-

ation was done under the open method, with hypnosis and local anesthesia. At this time sclerotic vessels were plainly visible, and there was also some cortical atrophy as the dura was opened.

Following this, the patient had considerable relief of his symptoms as reflected by the fact that he no longer needed heavy sedation. However, he continued to complain of pain, though admitting it was much less intense. His general condition also improved so that he changed from a bedridden individual to one who was fairly active around the hospital. He was discharged in November, 1948, and returned for a check-up in April, 1949. The findings at that time still revealed a mild left hemiplegia and hyperesthesia on the left. When the patient was first discharged from the hospital, he was able to work steadily in a restaurant as a chef. However, he found it increasingly difficult to continue and about two months prior to the April admission, he had to stop working because of the pain in his left side as well as some weakness in that side. His social adjustment during the interim has been one of a "lone wolf", with the patient spending almost all of his time by himself either in his room or taking short walks. He has shown little interest in any activities. He entered the hospital, requesting that something be

done to relieve him of his symptoms.

At this time also the patient presented a picture of blandness which was evident in his facies which rarely changed expression, and in his rather monotonous tone of voice. He constantly complained of his pain although he never actually appeared to be suffering. He showed a great deal of reluctance in participating in any activities, using the pain as his reason for not doing so. He was well-oriented in all spheres. His intellectual capacity appears to be about average and there is no striking evidence of organic intellectual changes. He answered questions logically and coherently but very briefly. He showed practically no spontaneity. The striking feature was his denial of receiving any significant benefit from his operation, although the obvious effect, in this regard, is quite apparent. He chose rather to continually emphasize his present difficulties in a somewhat hostile way. His general reaction to his illness has been one of withdrawal and marked dependency on the hospital. His judgment is only fair and insight is meager.

He returned to the hospital for another check-up and in December, 1949, about six weeks after his last discharge from the hospital, he wrote a letter to the neurosurgeon as follows: "Just to let you

know my condition, which is not good. I am getting worse instead of better. The pain is getting into the right shoulder and my left side has been giving me fits ever since I came home. It is much more painful than ever. Also very sensitive more than ever. Am still unable to sleep for at least one to four hours after retiring. Am wondering if it would be possible for me to get a prescription for some sleeping pills, must be the old strong type as the weaker ones never did me any good. Have not been able to work any since I came home and it is really rough that way with room rent and insulin and meals to pay, which my pension will not cover. What is the procedure in making application for admission to Wadsworth home?" (apparently for domiciliary care) "Would appreciate it very much if you will write and explain it to me. Tell everyone hello for me." In the last contact in relation to this patient, it was heard that he had applied for domiciliary care at another V. A. hospital.

B. C.

The patient, born in 1895, is a white, married, clothing store owner, of moderate economic circumstances, in a small town in Kansas. The

patient was transferred to this hospital from Wadsworth V. A. Hospital in August, 1946. He was in the Army during World War I, and completed a high school education.

Since the age of 16, the patient has had recurrent episodes of hyperactivity, seclusiveness, confusion, and hallucinations, lasting one to two months and occurring about every two years. At twenty-two years, while in the service in France, he suffered a severe nervous breakdown, characterized by depression, crying spells, fatigue, palpitations, and fear of impending death. He was returned to the United States and hospitalized in a Government hospital. Since then he has been hospitalized at many institutions and veterans facilities, always with the same complaints. On two occasions, he has been a patient in the Menninger Sanitarium. The patient's illnesses were characterized by alternating periods of seclusiveness, isolation, irritability and mute depression, alternating with hyperactivity, laughing, grandiosity, and expansiveness and boisterous talking. Frequently he verbalized delusional material, describing his relationship to God and Jesus. He has been variously treated with insulin comas and electric shock with only temporary remissions. On several occasions he has brutally attacked people and beaten

them. In general, during his psychotic episodes, the patient has been very confused. On numerous occasions he has undressed and walked in corridors in the nude. He has eaten bugs, cockroaches, and other insects and expressed many bizarre religious ideas, talking about Adam and Eve and identifying his own body as a part of the Lord Jesus. He frequently stated that he was Adam and that all other people were Satan and were trying to get him. He walked about his room moaning and groaning, looking up to the heavens, and seemed to be answering voices. At times he sat and cried. Late in 1945, he went to Wadsworth Hospital for a check-up on his G. I. tract and while in the hospital became acutely disturbed, had hallucinations, and was depressed. He was transferred to this hospital on August 3, 1946.

When seen preoperatively over a three months period, the patient usually was dull, his manner lethargic, withdrawn, indifferent, and moderately depressed. He kept aloof from other patients, not socializing at all. He was usually cooperative, and he showed a good degree of empathy and warmth, although it was observed that he continuously turned his head away from the questioner as if listening to voices. Intelligence seemed to be bright-normal to superior and information was commensurate with his

cultural and educational background. Usually he denied all delusions or hallucinations but he sometimes appeared to be listening to voices, frequently talked to himself, and on several occasions verbalized bizarre ideas about reincarnation phantasies to the examiner. He is preoccupied with religion and stated on one occasion that he actually knew Jesus in a previous life. Often when denied a request, his behavior became quite peculiar, seemingly a caricature of compliance. He walked up and down the ward in a military fashion, saluting all aides and the doctor and nurse, doing about faces and standing at attention. Occasionally he crawled on all fours like a dog and licked the floor. On several occasions, he went about for several days with his arms fastened inside his belt. When asked why he did this, he stated he was afraid he would hurt or injure someone. Several times he has acted as though he were a dog, crawling on all fours, asking for candy bars and then taking them to his corner and eating them as a dog would do. He made frequent requests for trial visits, staffs, and many other things which had to be denied. He was heard to make homicidal threats against his wife and frequently urged her to make suicide pacts with him. The long history of illness in this patient, the increasing frequency of psychotic episodes, and

progressive shortening of duration of the periods of remission; the failure of electro-shock and insulin shock treatment to help this patient in any way or to provide more than a very temporary remission, and the apparent poor prognosis with ordinary forms of psychotherapy or physical forms of therapy led to consideration of prefrontal lobotomy. On March 31, 1946, he was presented to the lobotomy committee where it was felt that he would make an excellent subject for lobotomy. Shortly thereafter, he was lobotomized under local anesthesia, employing the lateral (Freeman and Watts) approach. Convalescence was uneventful and not marked by any crisis or change in his vital signs. For a few weeks after the operation, he was quite lethargic and unwilling to leave his bed. After this, a rather prolonged period began in which the patient was euphoric, exhibited a marked pressure of speech, and was very jocular. He was very circumstantial, joking about everything, grinning, laughing, winking, and acting like a happy, foolish boy. He was acting the role of a clown and a comic. Other evidences of frontal release were his punning, joking, and marked tendency to perseveration, repeating certain phrases over and over. In addition to this he developed an enormous appetite, eating double and triple portions of all meals as well



as gorging himself on candy. At other times he had sudden outbursts of extreme irritability precipitated by trivial events. Often he would molest the nurses in an erotic fashion when they were in his proximity. It was at this time that a type of educative suppressive therapy was begun by the examiner as prescribed by Dr. Frank. In a kindly but firm fashion the patient was made to attend activities, including the greenhouse, OT shop, and others. He was criticized in a kindly fashion when his behavior was unacceptable and pressure was put upon him to conform to the rules and regulations. Although resenting this to some extent, the patient gradually began to improve on this regime. The marked tension, anxiety, and depression which were so characteristic of this patient preoperatively were not observed postoperatively. As time went on there seemed to be a mild leveling off of excitability and euphoria. However, he remained circumstantial, perseverative, and silly, although he ceased to bother the nurses and seemed to be compliant and cooperative. He was gradually given a slight but increasing amount of freedom, being allowed to bathe and shave himself, go to the PX and around the hospital without an attendant. He was given passes in the custody of his wife. The marked flight of ideas and pressure of speech seemed no longer permanent and he was able to carry on a conversation

without too many digressions. His interest in activities and in other people seemed to increase. However, he became increasingly insistent that he wanted to go home. At this time, it became quite apparent that the patient's wife did not intend to take him home and that she was very anxious to keep him in the hospital permanently for one reason or another. The increasing pressure to leave the hospital manifested itself finally in two successive elopements from the hospital by the patient and at both times the patient attempted to get to his wife, and both times he was returned to the hospital by the sheriff. Following the second elopement, he was transferred to a closed ward. Here, he was extremely demanding and hostile to personnel and to his physician, very resentful of the transfer to the closed ward, and continuously demanding his release from the hospital. Several months ago the patient's wife opened divorce proceedings against him and when the patient was informed of this he was hurt and wept but as in his other feelings and reactions the effect was a superficial one and soon he was his usual jocular circumstantial self. During this period, the patient's sister and the physician had been looking for a responsible relative to take him from the hospital on a trial visit, because it was felt by all of us that he had improved sufficiently and was no

longer a management problem and that he did not require closed ward supervision or care. Finally it was decided by a niece and nephew who live in Kansas City that they could take him to their home in Kansas City for a trial visit of 90 days. These people seemed stable, hard working, and comfortable, and they both seemed to like the patient. There are no children in the home and it was felt that the patient would receive adequate care from them. At no time throughout his hospital stay has the patient manifested any overt, aggressive activity aside from verbal aggressions. The patient got along very well on his visit in Kansas City, and it was extended for an additional 30 days. He went to Amarillo, Texas, and lived with a sister there about four months after leaving the hospital, and again made a very satisfactory adjustment. His sister has written and seemed appreciative of the help they were able to give him in readjusting, although he had not gone to work wither full or part time. He returned to the hospital on January 24, 1949, in order to request a discharge from his trial visit status. Examination at this time revealed that he is still somewhat circumstantial and perseverative and garrulous, but this is much reduced. He showed a fair amount of judgment, although insight is totally lacking. He was cooperative to examination procedures,

and to suggestions, and readily agreed that if the doctors felt that he should not return to Garnett, that he would continue to follow their recommendations. He has a satisfactory income from a 240-acre farm and from the clothing store business of which he is a partner. He states that he will return in six months for a check-up and that if any difficulties arise before then he will voluntarily return to the hospital for treatment.

Following the patient's final discharge from the hospital in January 1949, he continued to visit here on occasions and write letters frequently, although no formal follow-up contact was being made with him. About two weeks after his final discharge he returned again to the hospital, just as he explained it, to visit with some of the friends he had made here, including the doctors, psychologist and nurses. He has been traveling around quite a bit and visited with relatives in Texas. He bought a new car with which he was very pleased and has done quite a bit of traveling. Meanwhile the divorce from his wife went through and he sold the half interest in his business. He feels that the lobotomy was a success. In relation to the deal regarding the sale of his share in the business the impression was that his business acumen is sharp and that he is doing a surprisingly

good job of considering all the various possibilities, and refusing to be rushed into any quick decisions. The impression from these visits of the patient are that they seem to be rather casual with him and that it is difficult to know exactly why he comes here when he does. He seems to be somewhat bored with life at the present and feels that he should get back into some kind of work. He seems to have a definite positive attachment for the hospital and enjoys browsing around here for a day or two, chatting with his old acquaintances. He pointed out that in the past two years, since the operation, he had none of the difficulties that had troubled him so many years previously. On subsequent visits to the hospital he reported that he married a woman in his home town, but that it turned out to be a considerable failure. She had much of his money and property signed over to herself and then left him when they visited in Florida. He is involved in some litigations to recover the bonds and money which she has, but does not show any very real concern in terms of the affect or involvement in the situation. He gets momentarily angry and aroused, but it is hard to feel that there is very much charge behind this affect. He could easily be redirected in his conversation, and he can enter into any other subject however distant it may

be from the previous one without any difficulty, and regardless of its content become equally involved in it for the moment.

E. Z.

The patient is a white, unmarried, male veteran, who was born in 1914, and was thirty-three years old at the time of the lobotomy in 1947.

The family moved about many times, but the patient graduated from high school at the age of 17, following which he enrolled at a university where he graduated in 1937 with a degree in the social sciences. His grades were excellent in grade school and were average and above in high school and college. The family does not recall any difficulties that the patient might have had while in school, although the patient was not very communicative at home. He participated in sports and other activities. Following his graduation from school the patient worked for a while in the circulation department of a small newspaper, as a clerk in department stores, and, prior to his army enlistment, as a bookkeeper and teller in a bank. In 1941 he enlisted in the Army and was offered an appointment in Officers Candidate School but refused it, because he intended to get out of the Army after one year

and go back to the bank. Subsequently, the patient served in the South Pacific in the Military Police, and later in the Air Corps as operations clerk.

The beginning of the patient's present illness is not clear, although it is known that the patient was admitted to an army hospital in February of 1945, and was finally discharged from the Army in June of 1945, and directly admitted to Wadsworth Veterans Hospital with a diagnosis of schizophrenia. During his hospitalization at Wadsworth, the patient had thirty-one shock treatments and was in a camisole restraint over long periods of time. There he was very suspicious and at times quite assaultive. In November of 1945, the patient was discharged from Wadsworth as having received maximum hospital benefit although "he was not well when he left the hospital but it was thought that he had a good chance to improve on the outside." At home he did not get along well. He made no effort to find a job, he was very suspicious toward his father and continued to present vague paranoid ideas. The precipitating event which lead to his next hospitalization was his father's observing him sharpening a large butcher knife. There is no account of any actual attempt to harm anyone but because of his paranoid attitude over a period of months his father wanted

to take no chances and had him brought back to the hospital. At the time of his admission, he was fairly accessible so long as the conversation was conducted on a very superficial level. Whenever any personal topics were touched upon the patient refused to answer. His reaction to the examination was one of extreme indifference, although he was quite alert and well oriented in all spheres. His recent memory was good and he gave no evidence of paresthesias or hallucinations. He did have a well integrated system of delusions which concern themselves with his being hospitalized and being the victim of a kidnap plot. He was suspicious of almost everyone, including his parents and his fiancée. He has often made remarks such as "I can't trust anyone." He believed that he was perfectly healthy when taken into the Army hospital but if he has undergone any deterioration it was entirely due to the shock treatments which were given him at Wadsworth Hospital.

Lobotomy was performed in June of 1947. Three months after the operation no consistent change in the patient's mental status was noted. Although at times he would be tranquil and capable of talking easily in conversational tones, at other times there would be a marked excitement and pressure of speech. Although he was still



preoccupied with grandiose ideas, he has not had any aggressive outbursts such as were present before the operation, and he was participating in athletics and other hospital activities. He was seen continuously by the same therapist for a year and a half, but during this time no permanent changes or improvements were observed. Although he remained accessible to the therapist, their conversation was always limited and the patient was rarely spontaneous, and his behavior in the ward continued to be apathetic and disinterested, and he stopped participating in activities. By the time a year had elapsed after the operation, there had been several episodes of irritation and anger, with growing irritability, pressure, and delusions of persecution and influence. He has made no friends in the wards, is not interested in reading, or in any other activities, and his appearance continues to be disheveled. He continued in this way through the second half of 1948, and his preoccupation with the voices he heard and the influences of radio and radar and thought interferences, as well as sexual preoccupations of various sorts, continued to mount. Following this period of increased hallucinations and disturbance, the patient began to withdraw more and more, and his therapist no longer succeeded in making contact with him as he had

previously. It was at this time that it was decided to attempt a second lobotomy. Following the second lobotomy, there was little change in his behavior, and the patient continued to be belligerent, aggressive, and hallucinatory. As a result, he was returned to the disturbed ward of the closed section. This behavior continued throughout 1949, with little change, so that sedative packs, sedations and restraints had to be used and seclusion had to be continually administered. Nor has there been any change in his condition throughout 1950. While he is not overtly aggressive, he continues to be preoccupied with destructive and aggressive thoughts, and he remains seclusive and hallucinatory.

R. M.

The patient, a male veteran of World War I, was born in the mid-west in 1893, and completed a high-school education. He was admitted to Winter Hospital in 1946, following a number of previous hospitalizations, with a diagnosis of involutional melancholia. Following his discharge from the Army in 1920 he had made a good economic adjustment in several occupations, having served as a radio mechanic, a house-painter, and just prior to his hospitalization as an inspector in a war plant. However, he had always found it

difficult to make friends because of his seclusiveness and shyness, and had been under the domination of his parents until their death in 1943. He is married and has two children.

The following events led to his present hospitalization. The patient first became ill in November of 1943 upon his return from the burial of his mother. He thought that he had had heart attacks several times during the night and prepared to die. He was hospitalized at that time, the diagnosis of involutional melancholia was made, and the patient was given fourteen electric shock treatments. He made a temporary recovery at this time and was able to work for four months until May of 1944. At this time he presented himself for hospitalization, complaining that he was shaky, jittery, and worried somewhat over the death of his parents, and that his head would shake and become numb. Following his discharge from this hospital he spent nearly all his life's savings in his search for treatment for his somatic complaints, which had begun about a month after the completion of his electric shock treatments. As soon as competent medical authorities would demonstrate to him that his particular complaint of the moment was medically unfounded, he would find another, and so on. Upon

admission to a Veterans' hospital in 1945 he cited a list of somatic complaints including fluttering of the muscles in the left upper quadrant, which descended into the left testicle, swelling of the testicles and a stinging sensation in them. He complained of increase of sexual libido, which he blamed on incomplete erections, and asserted that the nerve running from the rectum to the penis seemed to quiver. He complained also of stinging in the legs, soreness in the ankles and arms, cold feet, blurring of vision, and the feeling that he was "going off into space". Upon his admission to this hospital a year later his verbalizations were essentially the same. At this time a thorough examination revealed no organic basis for somatic complaints. In November of 1946, he received sixteen electric shock treatments here, without appreciable improvement. At the time immediately proceeding the lobotomy, the patient continued in his obsessional hypochondriasis, insisting that he no longer has any strength, that his vitality is going fast, and daily he begs his doctor to send for the wife in order that she may arrive here before it's too late. In view of the fact that the patient had had thirty electric shock treatments without marked improvement, and that he had been ill now for over three years, it was felt that the prognosis at this time was poor and that lobotomy might offer the patient

his only opportunity for improvement. He was lobotomized in July of 1947

Following the lobotomy, the patient showed definite improvement. He attended all hospital activities consistently, and worked effectively in the various occupational therapy shops. His hypochondriacal preoccupation continued in a much milder form and his apprehension about dying disappeared. He was discharged from the hospital on April 5, 1948, and returned in July for a post-lobotomy check-up. Following this check-up he was discharged and returned again in January of 1949 for a follow-up. At that time he was in good spirits and well oriented and did not show any signs of psychotic activity. His adjustment at home was fair, spending his time helping his wife around the house, but being very reluctant to finding outside work and continuing his somatic complaints. Shortly after the patient returned home, the wife reported to the social worker that the patient seemed rather indifferent and nonchalant, lacking in emotion in his relation to his wife and children. In contrast to his premorbid manners when he used to be very affectionate, he now seems to refrain from showing any affection. This kind of indifference was reported by the wife to be true especially in relation to their sexual activity. He has very little desire and gets over with it quite rapidly. The wife feels that there is a

genuineness lacking in his emotional expressions to her. Once, on a visit to the family cemetery where his parents were buried, he showed very little interest or emotion, despite the fact that the parents' death was the precipitating factor in his illness. He takes part in few social activities, and although he visits relatives, he doesn't particularly enjoy the visits. However, he does take active part in the American Legion group and gets along quite well there. He tends to be especially irritable in his relationships with the children, and would have temper outbursts towards them, although subsequently he would realize that he shouldn't have done that. Since his discharge he had worked only one week at a job outside the home. However, under his wife's general guidance and planning he keeps his time occupied at home. He often does the shopping, pays the bills, mows the lawn, paints and papers the house, and things like that. He helps the wife supplement their small income by doing some work which she contracts for at home. He continues to go out and meet people, and seems to enjoy social intercourse, but is often tactless in his dealings with them. The main point of discomfort at home is over the disciplining of the daughters, and the patient has shown increased irritation about this matter. Actually, his present readmission to the hospital was really

precipitated by a short episode of rage, in which he took up a broom and threatened to hit his daughter. The family was frightened at this time and because of other evidence of minor misbehavior it was recommended that he return to the hospital for further observation. He returned to the hospital in August of 1950 and at this time the patient had not shown any of the irritability or emotional lability which was said to have characterized his behavior at home just prior to his re-admission. He was always quite pleasant and cooperative, and seemed interested and eager to attend many of the activities. There seemed some definite impairment of memory noted, as well as some impairment of judgment, particularly in the area relating to the kind of a job he thought he would be able to do when he was discharged from the hospital. He had none of the complaints of a hypochondriacal nature that had been present before the lobotomy, and he himself felt that he is in pretty good health. There was obvious impairment in the ability to generalize, and the patient's interpretation of proverbs, for instance, were markedly concrete. After six weeks in the hospital during which time he was counseled about job opportunities and relationships with his family, he was again discharged with the feeling that prognosis was good.

K. H.

The patient was admitted to this hospital on September 20, 1946, as a transfer from Wadsworth V.A. Hospital, where he was confined after being CDD'd from the Army for psychosis, unclassified on 1-27-46. Family background includes a father who was always considered a little "simple", and is at present committed to a State Hospital, a neurotic mother, now deceased, and four siblings. They lived on a farm and were in poor financial straits during most of this existence. The patient completed grammar school, and did farm work and other labor before entrance into the Army. Premorbidly he was considered a pleasant, amiable, easy-going type of individual.

The patient entered service on April 27, 1942, and was adjusted until hospitalization overseas on September 3, 1945, because of a statement by his commanding officer that he didn't talk sense and was acting queerly. He was seclusive, preoccupied, and frequently stared into space. When hospitalized he had numerous inconsequential bodily complaints, delusions of grandeur, and thoughts of persecution and of death. He reacted to visual and auditory hallucinations, believed that he had been shot down, and



thought he was being cut with electrical knives, etc. There was emotional blunting and inappropriate effect. He was incoherent, disoriented, disconnected in his speech, and gave expression to a word salad type of discussion. He was evacuated to the Zone of Interior with a diagnosis of paranoic schizophrenia and admitted to an Army Hospital on December 8, 1945. There he was euphoric, dissociated, manneristic, and at times impulsive. He appeared friendly and cooperative. There was some perseveration, and effect was completely dissociated. There were delusions of grandeur but he denied any hallucinations or ideas of reference. He adjusted to ward routine, but his delusions persisted. Blood and spinal serology were negative. However, because of definite dysrhythmia in the EEG and defects visualized on skull X-rays, the question of organic basis for his psychosis was raised. This, however, was not confirmed at the Army Hospital and he was subsequently transferred to Winter Hospital, and at the time of admission was in good health, neat, pleasant and relevant on superficial observation, although more involved investigation brought forth an intricate delusional system as follows: He thought he was here on a "schedule", that he was a "world authority" and that his power was "supreme to everyone in the country."

He thought he had been shot through the heart and through other vital organs on innumerable occasions, that he had been dead several times, and that while he was asleep the people were shooting at him constantly.

The patient was placed first on a closed ward and then on a semi-closed ward where he presented no management problems, participated in all activities and fitted his existence into his schedule pattern so that if he felt like completing a certain OT project, he said that the schedule was finished by that date and he could no longer work on that project. By August of 1947, after one year of no apparent movement, it was felt that this patient was a suitable candidate for lobotomy. By September, 1947, the patient was approved and a series of medical testing was started to rule out any organicity which had presented itself in this hospital as a grand mal type of EEG and mild cortical atrophy of the left frontal parietal areas. A clinical neurological examination showed no evidence of focal organic disease of the nervous system and a pitressin test provoked no convulsive seizures. By the end of October no contra-indication to surgery was found and operative procedure was scheduled for November, 1947.

A bilateral prefrontal lobotomy was per-

formed with no complications, and the post-operative course was essentially uneventful. The confusion and lack of spontaneity of the first several days gradually lessened so that twenty-two days after the operation he was able to be presented to a staff conference. He presented his usual exterior of affability, answered questions relevantly and when questioned about his delusional system of schedules said that it was still present but where heretofore it was constantly on his mind, it now did not bother him as much.

The patient was admitted to an open ward the second week of January, 1948, and adapted himself to his usual reserved and totally relevant manner, going to OT shops in the morning and gymnasium in the afternoon. Only upon being questioned specifically was the psychotic material elicited. The content is similar to the material pre-operatively. The question of his being a world authority is an undisputable fact; he still believes people are trying to hypnotize him during his sleep and the inevitable schedule is ever present. He was questioned closely on the differences of these beliefs before and after operation and according to the patient they abated in intensity and concentration immediately after the operation so that he had many more moments of freedom from their

influence than before but he feels that now (three months postoperative) they are returning to a degree almost level with that before the operation; however, he feels that in the future there may be a chance of this condition "wearing itself out" and disappearing finally. At no time does the patient question the validity of any of his presentations. The patient's sister noted a difference in emotionality, pointing to such things as his more frequent correspondence, his sending of a Christmas gift, his warm reception of her visit. She felt that she found a vast improvement.

Following his continued good post-operative adjustment, he was discharged from this hospital in June of 1948, about seven months after the lobotomy. One month later he obtained a job as a handyman, and then as a maintenance man in a shoe factory, which he has held without apparent difficulty. In December of 1948, he was married to a girl who worked at the same factory.

He was re-admitted for post-lobotomy studies in April of 1949. At this time, he was correctly oriented, friendly and cooperative. He was somewhat emotionally flat, but no delusional content was manifested in casual conversations, nor was there any probing regarding his former delusional system.

J. D.

This white, single, male patient was admitted to this hospital November 5, 1946 as a transfer from Wadsworth V. A. Hospital. He was twenty-seven years old at the time of operation in November, 1947

This patient had been examined at the Menninger Clinic in March, 1942, at which time it was believed that he was on the verge of a psychotic break, and although hospitalization was advised he returned home with his mother. He enlisted in the Coast Guard in July, 1942. In December, 1942, he was recognized to be ill and was hospitalized, and discharged in January, 1943. He lived at home with his mother until May, 1943, at which time he became worse and was sent to a hospital in Omaha, Nebraska, where he remained until July, 1945. During his twenty-six months of hospitalization, he received insulin shock and electric shock therapy in considerable amounts.

Following discharge he got along well with his mother at first, then began having episodes of depression, anger and displayed hostility toward her. On November, 1945, he entered the Menninger Sanitarium. Here, a diagnosis of chronic paranoid schizophrenia was made and because of the danger of suicidal and hom-

icidal acts he was transferred to Wadsworth V. A. Hospital.

At the time of admission to Winter V. A. Hospital this patient is described as being confused and disoriented, but cooperative. He readily admitted suicidal intent and intimated homicidal intent. His thoughts were morbid and disorganized and his affect inappropriate. He had ideas of being hooked up with another person in some sort of a closed circuit. His thoughts showed paranoid trends, and he expressed ideas that people want to change his body into that of a woman. Insight and judgment were defective.

While under observation he was quiet, cooperative, requiring no restraint or sedation. He mixed to some extent with other patients and participated in ward activities. He was sent on a 90-day trial visit from which he returned in a couple of weeks, his mother stating that he was not getting along too well. Following his return to the hospital he made a satisfactory ward adjustment for a time and on December 20, 1946, it was decided that he should go out on another trial visit. He was away for a short time, made a poor adjustment at home which necessitated his return to the hospital. In the hospital, he did poorly. At first he went to the radio shop, but he soon lost interest in

this activity and subsequently remained on the ward and refused to participate in any activities. At times he would maintain in catatonic-like positions for periods of time and on other occasions he would pace the floor rapidly. He made no satisfactory relationships with other patients. He was hostile and negativistic and showed frequent disorganized thinking.

Following the lobotomy in November Of 1947, he has shown some slight improvement in that he is less hostile and shows a slightly increased warmth in his interpersonal relationships.

He was seen regularly by psychotherapists, and there is a general improvement in which his impulsiveness had disappeared, his suspiciousness lessened, and his manner more affable, as well as a decrease in his disturbance by his delusions and hallucinations and continued in this way for about six months after the lobotomy. During all of this time he remained on an open ward. Subsequently, however, he became more aggressive towards other patients threatening to stick his finger or cigarettes into their eyes. He got into fights with other patients, and as a result he was transferred to a closed ward. He continued in his characteristic behavior, and remained bland, distant, and detached. The pre-lobotomy delusional condition persisted.

As of August, 1950, no further change was noted. He remains irritable, brusque, and paranoid. His relationships with people are rarely friendly, and his appearance as well as his behavior remains impassive and motionless, except that occasionally he does show some anger. The prognosis continues to be poor.

T. B.

The patient is a white, male, unmarried veteran of World War I, who was born in 1898. After completing two years of high school he enlisted in the Navy in 1915. He was discharged in 1920, worked as a watchman on a railroad and as a barber until 1925. In 1925, he was hospitalized because of "nervousness". He escaped from the sanitarium in Chicago and enlisted in the Army and served for three years without difficulty. After that, however, he was court-martialed for refusing to obey an order and was sentenced to three years imprisonment. After serving two years, he was hospitalized on the closed ward, but was discharged after two months. He again worked as a barber and a watchman, but turned himself into a hospital in Iowa because of his nervousness. He was hospitalized here for two years and then transferred to a V. A. hospital where he stayed for thirteen years. He



worked there while being a mental patient, taking care of a ward, shaving his fellow patients, and also had a job on the grounds during the day. In 1945, he wrote to a friend who arranged for his discharge. He then worked for a year in Chicago as a night watchman. Subsequently he became involved in extensive litigation with the Veterans Administration, when he attempted to collect \$40,000.00 which he felt was owed to him for his many years of work in their hospital.

Following the threat to the employees at the Regional Office of the V. A., he was committed to this hospital in March of 1946. He was described as a heavy set, muscular person who was remarkably well preserved, both mentally and physically, considering the length of his psychosis. At all times he was cooperative and compliant, attempting to please when he could, and remained on an open ward. He maintained an air of bravado, and remained generally elusive. He had a good sense of humor and would frequently joke in a dry manner, often covering up his paranoid delusions with a slight smile and jest. The delusional system was well systematized, centering around the \$40,000.00 that he maintained was owed him, and the feeling that he was being illegally held in the hospital, and that there were gangsters from Al Capone's

Chicago gang and others who in some way were conspiring with the doctors and other officials of the V. A. to prevent him from getting his money. Occasionally, he would flare up and become quite threatening and involved in litigations by letter with officials in Philadelphia and Washington.

Lobotomy was performed in March of 1948. Within a month, the confusion, inertia, and lack of spontaneity decreased and he resumed some of his delusions. Generally, however, he continued to dissimulate and had attempted, as previously, to be cooperative and compliant. Intellectually, he seems to function at a slightly lower level, more concretisitically, and he has noted diminished ability to coordinate in playing the piano and working at ceramics. He cannot conceptualize as well and when he encounters a difficult task in playing the piano, he is unable to understand it or carry it through. He speaks of his delusions in a somewhat less intense way, with more joking and laughter, and they can be forgotten easily by changing the topic of conversation. When the physician who worked with him for over a year, and saw him three to five times a week, left this hospital, the patient showed no evidence of being disturbed. In November of 1948, the patient began going on passes down to town and referred less and less to his delu-

sional system. He gradually accepted the fact that the \$40,000.00 was lost to him and he more or less resigned himself to this reality fact. He continued to demand his release from the hospital and his money, and refused to make any plans for steady work other than stating he would do such odd jobs as came up, pointing out the fact that each time he had been released from the hospital he had been able to get work promptly, and to make and save money. It was felt that he was no longer dangerous and that any threats that he made were probably quite hollow and without any real affect. His judgment is still defective but it seems to have improved during the two years of hospitalization. He has no insight into his illness but it is believed that he will be able to function at a minimum level with his pension and other money that he could earn. He was discharged from the hospital in April of 1949. No formal follow-up was maintained with this patient after his discharge from the hospital. However, he continued to write to the social worker here through 1950. Apparently he had traveled all over the country but returned to Kansas, to his hometown where he knew some people. In the earlier letters he continued to be plaintiff, bitter, resentful, and paranoid. The letters were formulated somewhat disjointedly and it was difficult to follow his trend.

of thought. He had employed a lawyer to help him recover some money, although it is not clear just what he had in mind. In his last contact on record, he expressed the feeling that he is finally getting acquainted with the people in his old home town, and he seemed to be in pretty good spirits. However, in the same letter he expressed also a good deal of the old bitterness, and the restlessness that he had been experiencing for a long time.

L. Z.

The patient is a white, unmarried male, who was born in 1899 in a small German town, the seventh of ten siblings. He came to this country in 1922, and immediately applied for his citizenship papers. He obtained employment at whatever labor he could get, and because he knew no English at all he had difficulties in his adjustment. On his own he picked up information about electrical work, and secured employment with a large company. He was extremely compulsive and became disliked by his fellow workers because of his extreme conscientiousness.

In 1942, he was drafted into the Army, but within a few months was given the opportunity to leave the service because of his age. He declined this opportunity because he felt it was his duty to

serve his country, and subsequently made a rapid advancement to the rank of sergeant, continuing his pattern of compulsive work. In June of 1943, he was hospitalized, and discharged with the diagnosis of psychoneurosis, hysteria, superimposed on a constitutional psychopathic state. He returned to his home town and opened his own radio repair shop, and during this time had frequent "hysterical attacks" which consisted of extreme excitement with extreme fearfulness, including a fear that he might throw himself under a streetcar. He frequently secluded himself in his little shack, locking the doors and windows and remaining there for days at a time. He was considered eccentric and peculiar by his neighbors, and the children were afraid of him. They frequently annoyed him by rolling tires at his home and throwing stones through his windows. He was hospitalized several times for periods of up to three weeks on a locked ward at a general hospital in his city.

Following periodic bouts of vomiting he finally sought admission to this hospital and was admitted here in September of 1946. He spent approximately fifteen of his first twenty months on the acutely disturbed wards and has never been off a locked ward prior to his operation. His condition

remained unchanged during his twenty months of hospitalization, consisting of an extreme fearfulness, of very marked mood swings with frequent hysterical attacks of screaming, with the accentuation of his paranoid delusions, and often resulting in unconsciousness for a period of hours up to three days. He frequently required seclusion, tubs, chemical sedatives, and physical restraints to prevent harm to others and to himself. He has displayed an extreme hypermnesia for the details of his past history, being able to give exact names and dates and even descriptions of the individuals mentioned. He displayed a great deal of masochism and frequently forced people into a position whereby he was "abused" and then would become extremely paranoid about being abused and mistreated. He displayed a marked startle reaction so that the slamming of a door would frequently send him into one of these hysterical episodes.

His sexual history consists of several periods of compulsive masturbation prior to and during hospitalization. He has never dated or associated with women and has had only one unsatisfactory heterosexual contact with a prostitute.

His diagnosis while in the hospital has varied from that of psychoneurosis, anxiety state,

severe, through emotional instability in a masochistic character and hysterical psychosis, to that of schizophrenic reaction, paranoid type.

A bilateral pre-frontal lobotomy was performed on April 30, 1948, under local anesthesia. The patient remained cooperative throughout the operative procedure, although there was constant moaning, cursing and screaming, which the patient stated was just to relieve the tension he felt and not because of pain.

For about two weeks after the operation, he was accompanied around the hospital on long walks and kept under observation by a special aide. Since then, for the past eleven months, the patient has been on open-ward status, coming and going without supervision. He showed the typical signs of frontal release for the first two months after the operation. He was confused about his period of hospitalization, about dates in the past, and he related to the examiner hallucinatory experiences. This confusion and the hallucinations occurred usually at the time the patient was awakening and, occasionally, as he was falling asleep. He remained rather euphoric, but without the terrific compulsive drive so prevalent prior to lobotomy, for about three months. Since then, his mood swings, from the euphoric, over-compliant, hypomanic state to that of a depressed, mildly agitated

extremely paranoid state, have followed one another with monotonous regularity.

The changes resulting from the lobotomy in this patient can best be described as quantitative rather than qualitative. The patient remains a very paranoid, masochistic, compulsive individual with cyclothymic mood swings. However, these mood swings described above are less intense in degree than prior to lobotomy. It is as though the peak of the hypomanic episodes and the peak of the manic-depressive episodes were knocked off so that the up and down curve has changed to a gentle slow one.

The patient is less compliant in his day to day activities. For the first time in the hospital, he has been able to criticize authoritative figures, and one finds him frequently walking down the hall, greeting doctors with a volley of curses. On the other hand, there have been none of the almost catastrophic explosions that occurred periodically prior to lobotomy.

He has made a fairly satisfactory ward adjustment since his lobotomy, which was certainly impossible during the two years of hospitalization prior to the operation.

Although he continues to talk of the necessity of going back to work, and exhibits remnants of



his intense drive toward perfectionism, one finds that he is able to accept and enjoy a passive, dependent hospital-patient role. He continues to express his feelings that the aides and others discriminate against him, stating that they make noises at night outside his room just in order to disturb him, that they give him less food than anyone else, and that they are talking about him and calling him "a damned German Jew, a Nazi, a spy", and he has ceased working in the shops. Instead, he spends his time talking and working with the employees in the boiler room, shoveling coal, with the janitors, and with the other laboring people around the hospital.

As of April, 1949, it was felt that a diminution in the mood swings and a general settling or bleaching process is still going on in the patient, and it is certainly going to be necessary that his affective discharges bleach still more before he can make any satisfactory social adjustment outside the hospital.

Gradually, however, the patient improved in the hospital while under psychiatric treatment, and plans were made for his discharge in October of 1949. Plans included the purchase of a house for himself on the outskirts of Kansas City, where he could take radio repair work and do it at home without having to

have too much social contact. It was also agreed that the patient would continue to come to Topeka to see his psychiatrist on an informal basis. However, he remains at the time of discharge, a very paranoid, masochistic, compulsive individual with cyclothymic mood swings, and will need continued counseling and support from the social worker and psychiatrist. It was expected that his adjustment will be that of an eccentric recluse.

M. M.

This white, male patient was born in 1919 and was admitted to Winter Hospital in October of 1946, at the age of 27, following a suicidal attempt by stabbing himself in the abdomen with a knife.

The patient's father died when the patient was one year old, and he was reared in a boarding house and by relatives up to the age of twelve, while his mother was working as a practical nurse. He completed ten grades of school with a great deal of difficulty because of his inability to concentrate, which he attributed to frequent daydreaming. He worked at a great number of different jobs on farms, in restaurants, common labor, and spent three years in and out of the CCC, making rather poor adjustment

on the whole and getting into frequent fights, and being fired from his jobs often. He entered the Army in 1942 and was discharged ten months later with a CDD for chronic otitis media. While in the Army he lived with a young girl for several days and she had followed him when he was transferred and talked him into marrying her. The marital adjustment was most unsatisfactory, interspersed with frequent separations, and also resulting in two children in rapid succession, the second one dying two days after birth. At this time the patient began to be extremely suspicious about his wife's fidelity and the paternity of the second child. He was jailed on a charge of having sexual relations with his wife's sister who was a minor, and his wife left him at this time permanently. He then returned to his native city and lived with his mother, at which time he began to have overt delusions and ideas of reference. This centered around feelings that people kept talking about him, telling him to go off and die, that his wife and baby were following him all over, and that his ideas, thoughts and actions were all controlled by these people. He was in a hotel room in Topeka when, in a half dazed state, he stabbed himself in the abdomen. About twelve or fifteen hours later, wondering what

to do he decided to come over to the hospital, where an exploratory laparotomy was immediately performed. His recovery from this was good but uneventful, and his hospital adjustment was adequate until February of 1947 when he made a nearly successful suicidal attempt by hanging. Shortly after that he became sexually assaultive, and he thought everyone was calling him a "queer". By August of 1947 he had completed forty-six insulin treatments, forty of which resulted in coma, with little or no improvement.

A lobotomy was performed in May of 1948, under direct vision with an anterior to intermediate cut being made. No abnormalities were observed by the neurosurgeon while the cortex was exposed. Immediately following the lobotomy the patient appeared to be markedly improved, expressed no delusional material, made a much better ward adjustment, and was no longer overtly sexually assaultive, although he was still very much interested and anxious to test out his potency. In September of 1948 he was given a series of passes in the custody of his mother, which were carried out without any difficulty. In October he was transferred to an open ward but during November became progressively more suspicious, began voicing paranoid delusions, was quite disturbed about

having to sign final divorce papers, became more and more persistent in loitering near and annoying secretaries and other female personnel, felt that one of the female patients was his wife, and believed that his sexual powers were being influenced and that he was being controlled by radio waves entering his head through the small scar on it. He also lost his ability to have erections. Because of this apparent relapse, he was transferred to a closed ward for a few days but after that was moved to a semi-open ward. Here slight improvement was noted, but the patient remained paranoid and suspicious. His affect was flattened though he appeared to be capable of considerable anger on occasions. He was childish and spiteful in his attitude towards other people. In December of 1948 he was presented to the Lobotomy Board for evaluation, at which time it was decided that he should remain on a closed ward for further observation, and should be continued in the supportive type of psychotherapy. During this time he maintained a well-fixed paranoid delusion concerning his hospitalization, believing that the doctors kept him here by giving him injections which he believed to be transfusions of blood from other patients, and by virtue of having the other patients' blood he then assumed their symptoms

of illness. The delusional material was presented straightforwardly with no exaggeration of affect. There were occasional strongly affective expressions, but these were of only momentary duration. In February he was given more passes in the custody of his mother, and these too were carried out without difficulty. By April of 1949 the patient was considered to be making a fairly good ward adjustment, and continuing to show an increased interest in women. He was effusive with flattery in their presence and occasionally attempted some physical intimacies with them, although extending only to putting his arms around them. He still complains that he can no longer experience erections as quickly and as vigorously as in the past. He still believes that this is a result of an injection he received by a doctor while asleep. No other changes have been noted in the patient's thought processes or behavior. At about this time the patient's mother requested that the patient be given a three month trial visit in her custody, and this was granted by the Lobotomy Board at the end of April 1949, with the advice that the patient make use of the facilities of the Mental Hygiene Clinic in the city to which he was going.

Social Service follow-up was continued in Denver. Shortly after he left the hospital, he went with his

mother to visit relatives and get along quite well, but on his way back to Denver he became irritable and critical, becoming progressively worse until he was almost unmanageable. He was loud, negativistic and apparently resentful of the mother's need to plan for him. Subsequently, however, the patient had been making an excellent adjustment in Denver and was getting along very well. He has made new contacts and is living near friends who have maintained continuous interest in the patient. In September of 1949, it was reported that he had been continuing to get along quite well, and he felt that he had no need to return to the hospital, although he still maintained that he was operated on only for experimentation. He recognizes that he is different than he was, that he is unable to hold a job, and that some people find him difficult. However, he shows no concern about his difference and seems quite satisfied with his present program. He continues to visit the social worker at the V.A. office in Denver, manages apparently to take care of his everyday needs, but his attitudes are hostile and belligerent. In the latter part of September 1949, the social worker reports him as seeming hostile about the change in his personality which he has difficulty in describing. He says that the "oomph" is gone from him, that he no longer

has the initiative that he once had, and that he resents this. He is not interested in seeking employment, and maintains that inasmuch as the V.A. operated on him for experimental purpose they now owe him a living and that no one can force him to go to work. He also seems to be concerned that some of his aggressiveness is lost, recalling how he had always been in quarrels, that he had always been the kind of person who became easily involved in fights, and although he still feels quarrelsome, he doesn't have the ability to carry through on a fight.

Social Service follow-up in Denver has continued to October, 1950. The patient continues to report for hourly interviews with the social worker once a week, and is always on time or early. In October of 1949, he was reported as talking very little about the strong feelings he had expressed many times earlier in regard to the hospital and the doctors, and exhibiting much less intense feeling in regard to these subjects. Instead, he seems more interested in talking about his plans for employment. Later in October, the Denver social service office reports that the patient is quite encouraged by the social situation. The patient had related eagerly that he had met a girl friend and he feels that there is a possibility that someone can love



him and that he can love another woman. He continues to talk about finding work and has made application with the police department. In regard to this it is interesting that in his application he included the information that he had been arrested and served a thirty-days sentence for contributing to the delinquency of a minor, but felt that the police department would not consider this important. There are also reports of other incidents in which the patient showed rather poor judgment. At this time it is also reported that the patient's attitude has changed, that he seems quite happy and almost gay, and that he seems much encouraged over having found a woman who could be interested in him. As of January, 1950, he was reported as still being paranoid, although he does express his anger openly. He has still found no work, maintaining that he has no energy with which to work, and still expresses bitterness about his operation. In March 1950, he is still unemployed and still has no plans for work. He has lost interest in the farm project of which he had talked some time ago. He does not seem to exercise very good judgment in regard to the plans he thinks about. He has made no close friends and no longer speaks of girl friends. In June 1950, he continues to come for his weekly interviews, and continues to express para-

roid ideas, with most of his hatred and bitterness directed against the two doctors who were responsible for the surgery. He feels that he has "been ruined", and that he will never be able to work again or have his normal "fighting blood" and virility. He maintains that with the surgery the physician purposely took away his virility and transferred it to the doctor who operated on him. He again maintains that he is not interested in employment and that the Veterans Administration should take care of him. He continues to attend church regularly and seems to have a deep sense of religion. In September of 1950, the patient remains much the same as before. He has held one or two jobs for a few days at a time but complains that he still has no energy to work nor any real interest in working. The last report from Denver is dated October 1950. He is still not employed but is willing to consider the possibility at this time, although he remains doubtful that he has enough energy to follow through on a job. One employer asked him what he had been doing for the past year and he remarked abruptly that it was none of his business. He still maintains paranoid delusions, such as that the hospital in which he was operated has influenced the foreman on the job to dislike him. He is being continued to be seen in the Mental Hygiene Clinic in Denver

while at the same time he remains on an extended trial visit status from this hospital.

In summary, seven of the nine patients had been discharged from the hospital, and making adjustments on various levels. Only one, KH, however, has returned to regular work, and remained at it. MM, RM, LZ, TB, and BC have all managed to remain out of the hospital for well over a year, at least, but none of these have been gainfully employed for any period of time. HP, when last heard of, had been living much like a recluse, and was making application for admission into a custodial institution. JD and EZ remain in the hospital, with little change in their psychotic condition. JD is somewhat more manageable now, but the paranoid schizophrenia is quite evident. EZ continues to be bizarre and withdrawn even after his second lobotomy.

Note: The foregoing clinical summaries were abstracted from, and are paraphrases of, material found in the clinical records up to November, 1950. The statements made reflect the views and opinions of the psychiatrists and social workers who were directly in contact with these patients and their families. The extent and detail vary with individual cases, since there is no uniformity in the amount and kind of material recorded.

## Chapter IV

### PROBLEMS, METHODS, and PROCEDURES

#### The Problems

The primary questions to which this research will devote itself are:

1. Do psychological tests demonstrate that there are changes following frontal lobotomy?
2. If so, what are these changes?
3. A secondary issue on which some light may be thrown regards the use of psychological tests in clinical research. Specifically, is it possible to utilize psychological tests in a measurable, quantified way, while at the same time employing a "clinical" approach to the battery as a whole?

#### The Subjects

The present study is limited to the evaluation of the psychological tests of nine patients who had undergone frontal lobotomy at Winter Veterans Administration Hospital. The surgery was performed by Dr. Leon Bernstein, Chief of Neurology and Neurosurgery at Winter Hospital. On seven of the patients the superior, direct-visual approach was employed; on patients BC and EZ the lateral (Freeman and Watts) approach was used. Following is a list of the patients, -all male,- their ages at the time of lobotomy, the diagnoses, and the interval between the operation and

the post-operative tests.

<u>Name</u>	<u>Age</u>	<u>Diagnosis</u>	<u>Interval</u>
HP	48	Intractable Pain	14 months
EC	51	Manic-Depressive	8 months
EZ	33	Paranoid Schiz.	9 months
RM	54	Involuntional Depr.	12 months
KH	35	Paranoid Schiz.	6 months
JD	27	Paranoid Schiz.	7 months
TB	50	Paranoid Schiz.	13 months
LZ	49	Character Disorder	9 months
MM	29	Paranoid Schiz.	12 months

Additional information about these patients is included in the Clinical Summaries.

### Procedures

1. Each of the patients was given an extensive battery of tests pre-operatively, which was repeated at intervals post-operatively. For the purposes of the present study only the immediate pre-operative tests and the second post-operative tests (i.e., the third time the tests were given as part of this research) were used. This was done in order to have the post-operative evaluation to be around a year after the operation, or as close to that figure as possible. The actual intervals range from six months to fourteen months, with a mean of ten months.

The following tests were included in the battery:

Wechsler-Bellevue, Form 1  
 Rorschach  
 Thematic Apperception Test  
 Word Association test  
 Bender Visual-Motor Gestalt Test  
 St. Louis Memory-for-Designs Test  
 Drawing-of-a-Man  
 Sentence Completion Test, Parts 1 and 2  
 Proverbs (344)  
 Szondi (one administration only)  
 Sorting Test (254)

Most of the test protocol was typed, with the exception of the Sentence Completion Tests, which were submitted in the patient's own handwriting. The scores on the Wechsler-Bellevue, Rorschach, and Sorting Tests were all checked by the present writer, in order to assure a consistency in this respect. Most of the original testing was done by the present writer, although other psychologists of the Winter Hospital staff also participated.

II. It has become evident from the review of previously published studies relating to the questions of whether psychological tests reveal changes following lobotomy, and the nature of these changes, that there is no unanimity and little consistency in regard to these questions. It was suggested that this equivocal state of affairs as far as psychological tests are concerned may be due, in part, to the way tests are used and the approach that is employed in their analysis and interpretation.

Various different approaches and techniques are to be found. These can be differentiated into several discrete methods. One is the time-honored and oft-employed method of manipulation of scores, and conversion of these into "signs", (although it is fairly generally agreed by now that these methods by themselves are incomplete and inadequate). In this research procedure single units of test data are isolated, measured, and compared with identical units of data from another group. For example, the number of responses on the Rorschach are counted, and this score, R, now becomes a sign: the occurrence of a greater number, or a smaller number, of R becomes an "objective" indication of certain hypothesized or deduced changes or conditions. This approach is essentially an empirical one, although attempts to understand its psychological significance may follow.

On a somewhat more complex level, a second approach is discerned. Here, two or more signs are combined still on a more or less empirical basis, and the simultaneous occurrence of these now becomes an indication of a condition or a modification of a condition. An example of this is the method described by D. Wechsler, in his discussion of the "hold" and "don't hold" subtests of the Wechsler-Bellevue Scale, as indicators of organic brain pathology.

While such relatively atomistic usage of tests is unquestionably legitimate, it has only limited utility. Its value is likely to lie primarily in application as an empirical index of certain occurrences in certain cases. On the other hand, should we find an instance that goes contrary to the empirical findings, the usefulness of the "sign" becomes immediately questionable. Even where the individual case does fit, it is not sufficient to observe this concurrence, since it can assume meaning only when explained, only when a rationale is supplied. Such "signs" have none of the characteristics of the universal laws in the natural sciences, which must apply to all observations. Rather, they are more in the form of gross indicators of direction or trend, which necessitates, in the final analysis, that each individual case be separately evaluated. They can be viewed, too, as representing certain abstractions from the test data. Scores are generalizations, or summations, of part of the myriad of behavior details present in the test battery, which it would be very difficult to grasp and comprehend at one quick view. However, just as any symbol, or abstraction, conceals the individual nature and characteristics of the details which are encompassed, so do the scores and signs fail to reveal the uniqueness and substance of the rich qualitative material which it abbreviates. This situation



might be thought of as analogous to any structure, wherein the signs represent the skeleton, while the qualitative data betoken its flesh and life blood. Such, indeed, is the orientation of the practicing clinician in his use of psychological tests, and extensive experience has proved at once the indispensability of this latter approach in actual clinical practice, and the relative inadequacy of the former. Experience has also suggested that, regardless of the reliability and validity of a clinical instrument, the skilled clinician remains the most important feature determining its useful application.

A practical clinical approach of this kind has been described and systematized by Rapaport (254), who accomplishes two things. He attempts to include the flesh and substance in his systematic test evaluations, and he provides a psychological rationale for the performance which a given, specific test requires, both in terms of motivational dynamics and in terms of the capacity level. This rationale is applied to scores on subtests as well as to whole tests tapping different aspects of personality structure. After describing the aspects of personality functioning which are represented by the test performances, he differentiates various groupings or patterns for a variety of pathological conditions. This is represented by "scattergram" analysis,

as on the Wechsler-Bellevue, where the mutual relationships of the eleven subtests to each other are simultaneously visible. This is not unlike the Rorschach "psychogram" used by Klopfer and others. From this gross data the clinician establishes "hypotheses" or "cues" about the general condition of the patient and the possible diagnostic classification, but is never likely to accept any of these possibilities as final. In actual practice, he is likely to find that certain patterns, when present, may often point to certain conditions; or that the same gross patterns may be suggestive of more than one condition. For example, lowered Performance scores on the Wechsler-Bellevue may suggest either depression or organic brain pathology, both consistent with the rationale that visual-motor functioning is represented by these subtests and is retarded or impaired in these conditions. Although support for one or the other of these possibilities might be found in other parts of the scattergram, the issue will approach resolution only by entering into the second step in the analytic procedure. Rapaport describes this as the item-analysis, wherein each subtest is examined for the distribution of the items passed and failed. Thus, on the Information subtest two people may have identical number of items correct, but it is certainly very important to differentiate between the one who manages to answer all the

items up to a certain point, as contrasted with another who fails numerous easy items while passing others on a more difficult level. In the first instance the point of failure is representative of the subjects intellectual limits; while in the latter it becomes apparent that disturbing pathological factors are obviously interfering with the normal recollection of simple facts. Or, to come back to the first example of the depressed versus the organic conditions, item analysis of, say, the Block Design subtest may reveal either that the lowered score here is represented by the total inability to grasp the problem, and to analyze the figure, and to synthesize it with the blocks, thus indicating perceptual difficulties suggestive of the organic; or it may be found that the problems are actually solved, but only after prolonged time, suggesting the retardation of thinking and activity characteristic of a depression. Finally, after the exploration of these more gross aspects of the test data, attention is paid to the "qualitative" aspects. Here are examined the more subtle processes which are not represented in the above analysis, such as the verbalizations and the infinite variations and feature that may be detected: mannerisms; fluency; anxiety and tension; special difficulties; etc. This gradual progressive approach assures a fair degree of inclusiveness as well as a dynamic use of the entire test battery

as one meaningful unit.

But even if the superiority of such an approach for clinical procedure should be granted, the problem has remained of subjecting the findings to any of the scrutinies and conditions that a scientific method in research demands. A major problem is the absence of any demonstrable objectivity in the "clinical" approach, together with the complexity that results from the introduction of innumerable non-experimental variables such as direct contact with the patients, peripheral information and gratuitous cues, not to mention personal predilections and prejudices, and individually varying selective perceptions. Furthermore, taking such factors into consideration, we are still confronted with the problems of comparing the findings of the different clinicians, or of determining and evaluating any consistencies for which we may be looking. This is a quandary which has long beset those who are interested in clinical research. It is a question of applying methods useful in other situations but inadequate in clinical research, or of proceeding without the established methods, and letting come what may out of the subjective analyses.

It is to such a situation that the development of the Q-technique has addressed itself, being a method which promises to overcome some of the difficulties inherent in the sigh-approach, and to supply a vehicle of some rigor to the

evaluation of the more complete clinical approach. As described by Stephenson (295, 296, 297, 298) it is a technique in which persons are correlated with regard to a series of tests, as contrasted with the R-technique in which tests variables are correlated with regard to a series of persons. He maintains that this technique "reaches pertinently into personality study, at least in a descriptive manner, if only because it centers about a few persons rather than a universe of them and about a universe of particulars, rather than about a few highly generalized traits." (297) At the same time, this technique permits the recording and relative weighting of clinical impressions, in a manner that allows these impressions to be submitted to statistical analyses.

In order to answer the first question (do psychological tests reflect change after lobotomy?), we make the initial assumption that those patients who have been selected for lobotomy have certain characteristics in common. These characteristics are likely to be represented by their psychotic features, since it is in order to relieve the psychosis that they were selected for treatment. Thus, a degree of commonality or similarity in this respect may be expected. Following the lobotomy, then, if change, as expected, has occurred, we may expect to find a smaller degree

of similarity among the members of the group, because with the alleviation of the psychosis there should be a natural resurgence of the more individualistic pre-morbid personality features. In other words, these patients are likely to be less alike after lobotomy than they were before. In order to determine the nature of these changes (as posed by the second question), various item-analysis techniques are employed.

The essence of the Q-technique lies in the trait-universe which consists of a number of items or statements regarding the subject under inquiry. For the purposes of this study the trait universe is comprised of a series of seventy-six statements which were selected on the basis of the two requirements. One is that they represent certain descriptions or "hypotheses" which are presumed by the various investigators to be related to lobotomy, either by virtue of the fact that they represent characteristics that are modified by the lobotomy, or that they are features which are introduced as a result of lobotomy. The second requirement is that they be statements which can be evaluated on the basis of psychological tests alone, in contrast with such overt behavioral manifestations, as, for example, over eating. For the purpose of the first condition the literature on lobotomy was exhaustively studied

and the descriptive statements from each study were noted on cards. To fulfill the second condition, the index in the book on psychological testing by Schafer (284) was consulted, and the personality descriptions found there were also noted on cards. This second source was of special value, since it assured not only that a broad sample of personality characteristics which can be inferred from tests was available, but also contributed towards a unanimity of understanding among the raters of the terms or concepts employed. This latter was possible because the approach and terminology used by Schafer was the one with which all of the raters, as members of the staff of the Menninger Clinic or of Winter Hospital, were familiar, since all had been exposed to this point of view, which was actually developed in Topeka by Rapaport and by Schafer. A total 660 were accumulated in these ways. Actually, in comparing the two sets of items (those from lobotomy literature, and those from Schafer), there was seen a very large degree of overlapping. There was, of course, a great deal of redundancy in the lobotomy items, but this frequency of repetition served as a basis of final selection of the items to be included in the trait universe. The list was progressively shortened by eliminating those items which were still relatively redundant. Of course, no attempt at absolute independence of items was made; (on the contrary, all of the items, relating as they did in each case to a

single total personality, were perforce mutually dependent). It was recognized, too, that there was certainly a degree of arbitrariness invoked in the final inclusion or exclusion of any item, but this may be justified since there is not available, certainly not in advance, any more appropriate basis for such decisions. The final trait universe of 76 items were all such that at least some investigators believed that they refer to changes following lobotomy, and at the same time were also such that they could be applicable to data available from psychological tests.

Despite such precautions as were taken, however, it was still possible that the exact wording of each statement as it was finally constructed might be understood differently by the different raters. To check on this, a preliminary study was run under the following conditions: A group of raters was used, consisting of second and third year psychology trainees at Winter Hospital, who were participating in an in-training course in diagnostic techniques. They had all studied and written reports on a battery of tests of a neurotic patient, and had also discussed the findings in the group sessions over a period of five or six weeks. Thus, they were all thoroughly familiar with the case, and at the same time had a common understanding arising out of the agreements reached in their class. They were each asked to



make a rating of this patient using the trait universe, and, in addition, they were asked to make notes regarding the individual items wherever they thought there were inconsistencies, ambiguities, vague formulations, redundancies, etc. These ratings were subjected to item analyses, and wherever a statement was found which had a wide range of discrepant scores, inquiries were made of the raters regarding their understanding of those statements. In addition, the notes that they had made were reviewed and discussed with the raters. All of this information was then used to modify the statements so as to eliminate these sources of misunderstanding.

IV. Since there was a total of eighteen batteries of tests to be rated, (nine pre-operative and nine post-operative), it was decided to use eighteen different raters, each one to evaluate one battery. These raters were selected from among the psychology personnel of the Menninger Foundation and Winter Hospital, all of whom had extensive experience with diagnostic techniques. It is worthy of note, too, that a greater degree of common understanding of concepts and terms could be expected from this homogeneous group than might have been possible under other conditions, since their basic orientation and practical approach to and usage of tests is essentially the one described

by Rapaport (254). While it was inevitable, in this close group, for the subject of the present research to be generally known, the exact design was not known by all of the participants, and certainly no one knew whether the case he was rating was a pre-operative or a post-operative record. Along with the test protocol, the following instruction sheet was included:

DIRECTIONS FOR RATING

1. Study the case carefully.
2. Enclosed are 76 separate statements. On the basis of the tests, sort these as follows:
  - a. Divide into 2 or 3 groups, making one group of those statements which seem relevant or salient for this patient; another group, on the other extreme, of those statements which seem most untrue, or non-salient; and a middle group.
  - b. Taking the first group, sort these out progressively until you have one statement under column 8, (this one being the most salient, or most characteristic one, as compared with the other 75); under column 7, place the next five statements which are more characteristic for this patient than the other 70. Continue in this way, placing 12 statements under column 6, and 20 statements under column 5.
  - c. Beginning now at the other extreme, place one statement under column 1, --this statement being the one which is relatively most untrue, or least characteristic. Proceed as above (Par. 2b), listing, in decreasing non-saliency, the remaining items under columns 2, 3, and 4.
  - d. After having sorted the 76 items into 8 groups place the number of the item in the appropriate column on the enclosed rating sheet.

- e. Please write the numbers clearly and legibly, to avoid misreading or duplication of numbers.

3. It is not necessary to rank order the items placed in any of the categories: e.g., simply place five statements under column 7, in any order at all.

4. If you feel that a statement may be interpreted either on a superficial, overt, behavioral level, or on a more basic dynamic level, make your decisions in terms of the latter.

Each of the items of the trait universe was presented on a separate slip of paper, to facilitate sorting. A list of the items in the trait universe, as well as a copy of the rating chart are included in the appendix. (Tables A and Fig. I.)

V. In view of the fact that the raters knew that the study was related to lobotomy an attempt was made to check on the possibility that the raters were following a "stereotype" of lobotomy in making their ratings, rather than being governed by the test data. For this purpose, eight of the original eighteen raters (four of these were those who had rated pre-operative records, and the other four had rated pos-operative tests) were given the same trait universe, approximately two months after they had made their original ratings, with these verbal instructions: "Sort these cards to describe an 'ideal' patient for lobotomy; i.e., for the kind of patient who you think would be most suitable as a candidate for lobotomy." It was recognized from the start

that the outcome might be equivocal, since even if there were high correlations between these "ideal" ratings and the original ratings, this may have an objective basis rather than being a coincidence due to a stereotype. In other words, if a similarity is found between the pre-operative ratings and the ideal, it may be that this condition is actually based on the tests, since it is just such patients who are selected for lobotomy. However, if the results were such that the actual post-operative ratings correlated much lower with the ideal than did the pre-operative, we would have evidence to contraindicate a stereotype factor.

VI. The question had been raised earlier whether the independent utilization of the quantitative data in the so-called "sigh-approach" without recourse to the qualitative material is sufficient and adequate. In an attempt to determine the extent of the information that can be yielded by such data, there will also be a presentation and analysis of the quantitative data for those test which lend themselves to such treatment. These tests include: Wechsler-Bellevue, Rorschach, Sorting Test, and, to some extent, Proverbs. In this way, we will have two classes of information. On the one hand, results derived via quantitative analysis along; and, on the other hand, the results consequent to the analysis of both the quantitative and the

qualitative data, as demonstrated by the Q-technique. This is considered possible because it is assumed that the rater, in employing his standard clinical approach to the analyses of the tests, will take into account and be influenced in the final evaluations of the tests by the scores and other non-qualitative data as well as by the qualitative material. The difference between the two modes of analyses in the present study, however, is that the raters do not have the opportunity of making comparative observations, as is done in the analysis of the quantitative data. It seems reasonable to expect that a highlighting of differences, i.e., change, occurs when both the pre-operative and the post-operative scores are available for comparison. On the other hand, and had the raters been permitted to inspect both the pre and the post-operative data, a significant element of bias would probably have been introduced into the experiment.

## CHAPTER V.

### Results: Analysis of Test Scores

#### 1. WECHSLER-BELLEVUE

All of the raw data relating to this test is presented in the appendix in Table B, and in Figures II, III and IV.

In this section each of the scores is taken up individually and examined for any group trends as reflected in the changes from the pre to the post. For each of the subtests, (excluding Vocabulary), two measures are recorded. One is the Vocabulary Deviation (V.D.), which indicates the position of each score relative to the Vocabulary score achieved on the same test. The other is the Intertest Deviation, (I.D.), representing the increase or decrease in the post-test over the pre-test. The former serves as an indicator of the relative position of any scores to the "expected" level as reflected by Vocabulary. The latter refers to the absolute change in that score. In order to have some base-line, -- general as it may be, -- reference is made to a study reported by Derner, et al. (340), on the reliability of Wechsler-Bellevue subtests and scales. Using a group of normal subjects, they administered the Wechsler-Bellevue a second time to each subject six months after the first administration, (among other experiments reported). On the basis of this data, the mean difference is obtained for each of the subtests and for the I.Q. scores. In all of the cases significant increases are noted, and it is assumed that these changes reflect

the practice effect of the re-administration. This mean difference score was used in the present analysis to serve as a basis of comparison for the changes found in lobotomy patients.

#### TOTAL I.Q.:

One is struck, at first by the consistency in this score, inasmuch as all of the patients show a change in the direction of improvement. On closer examination, however, it is seen that for most of these, (except for H.P. and M.M., +15 and +10, respectively, and J.D., +7) these increases are very small. Compared with Derner's findings of a mean difference of +6.2, only the three mentioned above improve more than would be expected on the basis of re-testing alone, inasmuch as the increases in the other six range only from 1 to 3.

#### VERBAL I.Q.:

Here the direction is not as consistent as for the Total I.Q., since we find that two patients go down in this score (7 points and 1 point). The remainder that improve range from 2 to 7 points up. Four of the seven improve more than Derner's score of 4.1. Thus, four of the nine patients exceed the limits to be expected purely on the basis of the learning effect alone.

#### PERFORMANCE I.Q.:

This score presents an even less consistent picture than does the Verbal I.Q. Five go up and four go down, although those that go down are relatively small (1,2,3,4) compared with those that go up (7,7,10,11,12). Derner's mean is 7.8.

VOCABULARY:

Of special interest is the relative absence of change in the Vocabulary score. In this group, four of the scores remain the same, two go up one point, one goes up two, one goes down one, and one down three. This is also in agreement with Derner's findings of a mean increase of 0.3, the lowest for any of the subtests.

COMPREHENSION:

In terms of the I.D., the changes are essentially equivocal, finding three +1, one +2, one +4, one +5, one zero, one -1, and one -2. Compared with Derner's mean of 1.0, we find only three scores exceeding this figure, but in terms of consistency no inferences can be made.

On examination of the V.D. scores, we find that there is some consistency in the Pre, in that most of these are below the vocabulary, but, again, only three of sufficient magnitude (-4, -5, -6) to be noted. This tendency, however, is diminished in the Post V.D., where only one score (J.D., -6) remains significantly below Vocabulary.

INFORMATION:

The only tendency to be noted here is the apparent stability of this subtest, with those changes that do occur remaining minimal. There is a very slight improvement, but hardly worth noting. In relation to the Vocabulary score, the deviations are also minimal, but do improve mildly postoperatively. Derner's mean is 0.6.



DIGIT SPAN:

The preoperative situation is quite marked on this subtest, in the consistent and sizeable drop in this score below vocabulary. The slight improvement in this respect after the operation is reflected in both the post V.D. and in the I.D. columns. In the latter, however, we see the scores going in both directions, -- four of them up, and three down. Derner's mean is 0.9.

ARITHMETIC:

This subtest is consistently at or below the Vocabulary in both the pre and the post (except for one which is 3 points above). The changes that do occur are small, and go in both directions, although there is a slightly greater tendency towards decrease than is true in the other subtests. Derner's mean is 0.8.

SIMILARITIES:

Of all the verbal subtests Similarities is most consistent, finding only one score going down, and one score remaining the same, while the remaining seven all go up, although the range is small. Despite this, however, the V.D., post does not improve much over the pre V.D., emphasizing in this way the initial considerable impairment on this subtest, which, following lobotomy tends to approach more closely the Vocabulary level. Derner's mean is

0.6, while the mean for this group is about 2.5, ranging from -2 to -9.

#### PICTURE ARRANGEMENT:

While both the pre and post scores are consistently below vocabulary, the I.D. column shows a somewhat consistent tendency to improvement. Thus, six go up, (from 2 to 5 points, one remains the same, and two go down (3 each). Here again, as in the case of some of the other subtests, the V.D. columns point up the extreme impairment of this subtest both pre and post, although less so post. Derner's mean is 1.4.

#### PICTURE COMPLETION:

Both the I.D. and V.D. remain very little changed, and show no consistent trends in the changes that do occur. In the I.D. four scores go down (one point each) and four go up (one to three points). Derner's mean is 0.6.

#### BLOCK DESIGN:

Here, as in the case of Similarities we find a striking consistency in the tendency for the scores to go up. In seven cases there are increases of from one to three points, no change in one, and a decline of one point in the last, with a mean of about 1.5 as compared with Derner's mean of 1.0. It is especially significant, however, in comparison with most of the other subtests, where such consistencies do not occur. This is supported also in comparison of the pre

and post V.D., where we see six scores below the vocabulary while in the post only three are below, and even in those there is a decrease in the difference. Of further interest, too, is the fact that not only do Block Design scores improve above the pre-operative level, they go, in five instances even above the Vocabulary level of the same test.

#### OBJECT ASSEMBLY:

This subtest, like many of the others, shows no consistent direction in the changes that occur: three go down and five go up. Nor is there any striking tendency in the V.D. scores, with the situation, in general, remaining essentially the same. Derner's mean is 2.0, the greatest of all of the subtests, though only one case in our group exceeds this.

#### DIGIT SYMBOL:

Here the V.D. both pre and post are of interest in that the drop below the Vocabulary is so consistent. Comparing the two V.D. columns it is seen that the impairment occurring preoperatively is not diminished postoperatively. Indeed, the I.D. would point to a greater loss on re-testing, -- small as it is, -- than is true for most of the subtests. Four cases go down, two remain the same, and only two go up. Derner's mean increase is 0.6.

#### SUMMARY OF RESULTS:

The consistent increase in I.Q. scores is represented

by the general, if slight increases on the individual subtests. Nevertheless, although most of the subtests have a relative preponderance of improved scores, two, -- arithmetic and digit symbol, -- present a somewhat reversed situation, suggesting that these fail to improve following lobotomy. On the other hand, two subtests, -- Similarities and Block Design, -- stand out in their consistent improvement. In each of these there is only one instance in which there is a minus -- in both cases small, -- only one remaining the same, and all the rest going up.

Examination of the two V.D. columns highlights several subtests in which the scores remain noticeably below the Vocabulary, even post-lobotomy, despite improvement tendencies seen on the I.D. This is especially true of Digit Span, Digit Symbol, and Picture Arrangement.

## 2. The Sorting Test

The Sorting Test, and the scoring system employed in the present analysis, are based on the descriptions found in Rapaport (254, Vol. 1).

The test consists of the following objects common in everyday experience:

A real knife, fork, and spoon; a miniature (toy) knife, fork, and spoon; a real pair of pliers and screwdriver, hammer, and hatchet; two nails; a block of wood with a nail in the center of it; two corks; two sugar cubes; a real cigar and cigarette; a rubber cigar; a red paper matchbook, a red rubber ball; a red rubber eraser; a red rubber sink-stopper; a white, 3 x 5, filing card; a yellow cardboard square; a red paper circle; a lock and key; and a bicycle bell.

The test is divided into two parts: Part I, consisting of seven items, and referred to as the "active" sorting, requires the subject to select those items of the entire group which belong with, or go together with, the one item selected by the examiner. When this is completed, the subject is asked "Why do all these belong together?" This is repeated for seven different items. Part II, the "passive" sorting, consisting of twelve groups of items, requires the subject to explain why a group of items, selected by the examiner from the total group, belongs together.

Following is a brief description of each score used in the present study:

1. Adequacy: This refers to the degree to which each sorting or explanation conforms with the norms for that

item. (For the purposes of the present study, only those items which were neither narrow nor loose were tabulated under this score).

2. Conceptual level of sorting: The range of the conceptual level is represented by the following scores:

- CD - conceptual definition
- C - concrete
- FD - Functional definition
- S - syncretistic
- Fab - fabricated response
- False - false explanation
- Fail - failure to find any explanation or to make any sorting

3. Concept Span: To represent the range of inclusiveness of the active sorting.

- L - loose (over-inclusive)
- N - narrow (insufficient inclusiveness)
- S/N - split-narrow (a definition based on part of the selected group)

The detailed results for each patient are found in Tables 1 and 2. These tables list the various scores obtained by each patient at each testing interval. Tables 3 and 4 present summaries of these detailed data in terms of the number of times these scores appeared in the entire group at the pre-op and post-op intervals, respectively. These figures are also converted into percentages, representing the proportions of the appearance of each score out of 63 on part I, and out of 108 on part II. The last two columns, headed "control", are scores taken from Rapaport, (284, Vol. I, pp. 544-545), for purposes of comparison

Table 1

SORTING TEST - PART IINDIVIDUAL SCORES

SCORES	HP		BC		EZ		RM		KH		JD		TB		LZ		MM		TOTALS	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
CD	5	6	-	1	2	3	2	4	3	4	5	7	1	4	6	6	6	7	30	42
C	-	-	-	1	-	2	2	-	1	1	1	-	-	-	-	-	-	-	4	4
FD	-	-	4	2	2	2	3	2	3	2	-	-	2	1	1	1	-	-	15	10
FAB	-	-	-	2	3	-	-	-	-	-	-	-	-	1	-	-	-	-	3	3
FAIL	2	1	3	1	-	-	-	1	-	-	1	-	4	1	-	-	1	-	11	4
NARROW	5	4	6	4	2	3	3	4	4	4	3	4	7	3	2	-	4	-	36	26
LOOSE	1	-	-	2	1	2	1	1	-	-	-	-	-	1	-	-	-	2	3	8
ADEQUATE	1	3	1	1	4	2	3	2	3	3	4	3	-	3	5	7	3	5	24	29

Table 2  
SORTING TEST - PART II  
INDIVIDUAL SCORES

SCORES	HP		BC		EZ		RM		KH		JD		TB		LZ		MM		TOTALS	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
GD	4	9	5	4	8	11	4	7	2	4	10	10	5	5	6	6	8	8	52	64
C	-	-	-	-	1	-	2	-	1	-	-	-	-	-	-	-	-	-	4	0
FD	1	-	1	1	-	-	1	1	2	2	1	-	-	1	-	-	-	-	6	5
FAB	-	-	1	-	1	-	4	-	2	-	-	-	-	-	1	-	-	-	9	0
S	-	2	-	7	-	-	1	-	5	6	-	1	2	2	4	5	2	3	14	26
S/H	1	-	1	-	1	1	-	3	-	-	-	-	1	1	1	1	-	-	5	6
FAIL	6	1	4	-	1	-	-	1	-	-	1	1	4	3	-	-	2	1	18	7



with the present data. Since our group consists of nine cases, the same number of cases was selected at random, -- the first nine, -- from Rapaport's "Well-Adjusted Patrol" control group, and their scores totaled and listed in the tables below. This approach was taken since some criteria or standards of expectancy were needed to evaluate the meaning of the changes that were found between the pre and the post scores.

Table 3  
Sorting Test - Part I  
Scores for the Total Group

Score	Pre	%	Post	%	Control	%
CD	30	48.0	42	67.2	29	46.4
C	4	6.4	4	6.4	12	19.2
FD	15	24.0	10	16.0	9	14.4
Fab	3	4.8	3	4.8	1	1.6
Fail	11	17.6	4	6.4	4	6.4
Narrow	36	57.6	26	41.6	41	65.6
Loose	3	4.8	8	12.8	8	12.8
Adequate	24	38.4	29	46.4	14	22.4

Table 4  
Sorting Test - Part II  
Scores for the Total Group

Score	Pre	%	Post	%	Control	%
CD	52	51	64	63	71	70
C	4	4	0	0	3	3
FD	6	6	5	5	7	7
Fab	9	9	0	0	0	0
S	14	14	26	26	6	6
S/N	5	5	6	6	5	5
Fail	18	18	7	7	6	6

Examining the findings for Part I, the active sorting, it is seen first that there is a definite increase in the number of conceptual definitions in the post-operative period. It appears, further, that this increase is over and beyond the number of CD's obtained by 9 normal subjects in the control group. As a sign of the "improvement" in conceptual thinking, it is supported by two other major indications. One is in the smaller number of failures post-operatively, - now at the same level as the control group; the other is in the reduction in the number of FD, again to approximate the level found in the control. It would appear, then, that the pre FD responses as well as the failures which occurred before the operation, are now replaced by sortings on the highest level of abstraction.

In the concept span, we see a definite tendency for a reduction in the number of Narrow scores, while at the same time half of that reduction turns up in the higher Loose score. Thus, the earlier tendency for narrowness is only in part "improved", as seen in the greater number of Adequate; while at the same time the tendency to depart from the Narrow has swung over as far as going into the Loose.

Part II, the passive sorting, is seen to be in essential agreement with the findings in the first part. Here too, the number of CD is increased, though in a smaller proportion and not coming up to the level of the control, in contrast to Part I. Improvement in conceptual functioning it would seem, is not as pronounced on the passive sorting as it is on the active sorting. The number of Failures in this part also decreases, as in Part I, to reach the level of the control, and none of the Fab responses reappear. At the same time, we notice a considerable increase in S in the post-op test.

In regard to the consistency with which these changes occur among the nine patients in the group, it is seen that in this respect some of the Sorting test scores appear comparatively definite, while others are more equivocal. Below is a breakdown of the distribution of the direction for each score.

## Part I

CD - 8 scores go up; 1 (LZ) remains the same  
 C - 2 go up; 2 go down; 5 remain the same  
 FD - 4 go up; 5 remain the same  
 Fab - 1 goes up; 2 go down; 6 remain the same  
 Fail - 1 (RM) goes up; 8 go down  
 Narrow - 2 (EZ and RM) go up 6 go down; 1 remains same  
 Loose - 4 go up; 1 (HP) goes down; 4 remain same  
 Adeq. - 4 go up; 3 go down; 2 remain same

## Part II

CD - 4 go up; 1 (BC) goes down; 4 remain same  
 C - 3 go down; 6 remain same  
 FD - 1 goes up; 2 go down; 6 remain same  
 Fab - 5 go down; 4 remain same  
 S - 6 go up; 1 goes down; 2 remain same  
 S/N - 1 (RM) goes up; 2 go down; 6 remain same  
 Fail - 1 (RM) goes up; 5 go down; 3 remain same

The most conclusive change appears in the CD for Part I. In contrast, although, as has been seen above, the total change in CD on Part II is in the same general direction, the consistency is not matched there. In regard to the number of Fail scores, Part I again appears to be more consistent than Part II. Actually, however, the contrast is not as marked here as it is in the case of the CD score, since the 3 Fail scores which remain the same on Part II are cases where failures did not occur at all, either at the pre or at the post interval.

### 3. Proverbs

A series of thirty proverbs was used, primarily for its value in estimating the level of abstract functioning. These proverbs are listed in the Wells-Ruesch Manual (344), separated into three sets each consisting of ten items of increasing difficulty. Although the manual cites some examples of varying levels of responses, no well-standardizing scoring system is available, the test being evaluated generally on a purely qualitative basis. Six of the patients responded to all thirty items both pre- and post-operatively, but for the remaining three only fifteen items are available. Table C, in the Appendix contains a list of the Proverbs used.

For the purpose of the present analysis a rough rating scale of from one to five was applied to each of the responses. Each response was read and scored, and qualitative annotations were made. The major aim here was to evaluate any possible changes, and for that purpose the two responses to the same proverb were compared, and a final score was given, representing the change that occurred as seen on the re-test. These changes were classified: mildly improved; much improved; no change; mildly impaired; and much impaired. In this section a brief summary will be presented first for each patient after which observations regarding the general trend will

be made.

H.P.

Of the thirty responses, eighteen were scored as no change; seven showed considerable impairment, four mild impairment. In only one response was there any improvement at all ("much").

A definite tendency appears towards impairment on Proverbs following lobotomy. It should also be noted, though, that the pre-lobotomy test already showed very considerable impairment in the level of abstract functioning, but that this situation became even more exaggerated post-operatively. In the re-test, too, there appeared a great deal more impotence, as well as more marked idea-finding and word-finding difficulties.

B.C.

(Fifteen items). As far as the scores alone are concerned, there is relatively little change. The pre-operative level already showed many poor responses, and these persisted in all instances. In addition, three of the responses which were previously adequately handled were now on a much lower level of abstraction, and there also appeared more fabulation. But the most striking difference appeared in a qualitative aspect, -- namely, a special kind of perseveration on which the patient now tended to rely. This

took the form of this patient's special preoccupation with business matters (which had been a very important part of his life) so that he would interpret many of the proverbs in the concretistic mold of this repeated idea. Some examples are: (don't count your chickens before they're hatched). "It means if you make an investment don't contemplate the profits until you receive it." (To the next item, Don't cry over spilt milk.) "If you make an investment and lose money, no use repenting it." In a total of six of the fifteen items this general theme was introduced, more or less appropriately or arbitrarily, although it did not appear at all pre-operatively.

#### E.Z.:

No change is seen in fourteen items; six improve and ten become worse. However, the change is more considerable when it is in the direction of impairment than when it is in the direction of improvement.

Actually, it is difficult to discern any definite tendency at all. Both pre- and post-operatively there was a great deal of impairment, but in both cases it seemed to be due primarily to a schizophrenic disturbance characterized by rambling, incoherence, bizarre ideas and neologisms. At any rate, no change in abstract functioning of the variety that would be associated with brain damage could be observed.

R.M.:

Of thirty items, eight were much impaired; nine were mildly impaired; seven showed no change; five showed mild improvement; and one was considerably improved.

In this case, it seems that there is a fair consistency towards impairment in abstract functioning. Qualitatively, there appeared in the post test a marked tendency to rambling, and fabulizing, without any apparent awareness of his departure from the starting point. This is in sharp contrast to his pre-op responses in which he would be satisfied simply to admit failure, and let it go at that.

J.D.:

Here, as in the case of E.Z., it is impossible to speak of any change at all, since both the pre-and the post-operative tests are permeated with the schizophrenic manifestations. There appears to be no difference in the quality, either.

K.H.:

Here there is a mild tendency toward improvement with a total of ten responses at a better level in the post than in the pre. It is of interest, however, that in the pre test the patient fails to give a single fully adequate response, although he succeeds in doing so on six of the post items. Thus, we find that although impairment in



abstract functioning is prominent both pre and post, some improvement does occur in the post. Qualitatively, this seems to be a consequence of the improvement in the psychotic state.

T.B.:

In the fifteen items administered, there appears generally very little change. He succeeds, at both testings to answer many of the items appropriately, though there is a very mild tendency to a more concretistic orientation post-operatively. This is most striking in his response to a stitch in time saves nine: Pre- "To act quick about things, is the best before someone is hurt"; Post - "Sometimes you get up and do something, it saves injury and it might cause nine extra stitches."

L.Z.:

It is difficult to conclude much from the Proverbs of this patient because, being German born, he had difficulty with the English language. It appears that in most of the cases he was unable to comprehend fully the colloquial character of these statements, so that his literalness could not be properly interpreted. There is a tendency in the post to more rambling and wordiness, as well as a greater use of personal references in a perseverative way.

M.M.:

The striking finding here is the rather consistent trend to improvement in level of abstraction. It should be emphasized, though that in no case is there any kind of deficiency that is related to organic impairment of abstract functioning. While he achieves a fairly good level on most of the post items, the pre is lower primarily because of the psychotic preoccupation, especially with such issues as guilt, moral values, etc.

SUMMARY

In summary for the entire group we find the following situation. Three patients (H.P., B.C., R.M.) all show definite tendencies towards greater impairment. It should be remembered, too, that all of these also showed considerable impairment in the proverbs pre-operatively. Two (J.D., E.Z.) show no change, primarily because of the overwhelming intrusion of psychotic ideation. Two others (K.H., M.M.) both tend to improve, but the initial impairments can be traced (especially in M.M.) to psychotic preoccupations. Two (L.Z., T.B.) remain more or less equivocal, although there are mild tendencies towards impairment.

#### 4. Rorschach

Examination of the various scores obtained by the group of patients on the Rorschach, as presented in Table D in the Appendix, quickly makes it evident that these scores cannot be treated in the same way as the scores on other tests. Any attempt to isolate any one score in order to determine a possible trend raises so many qualifications and contingencies, and renders the isolated score so meaningless, that this mode of analysis could not be carried out for the Rorschach.

In addition to the fact that no meaningful consistencies could be discerned, an example of the difficulties encountered may serve to clarify the issue. It is possible, for example, to say that the number of R has consistently increased, and this statement may have some limited significance. But if we should refer to such scores as the F%, or the W% as going up or down, we see immediately that it is first necessary to know precisely from what it went up or down. Thus, a W% of 80 that goes up can hardly be considered in the same category as a W% of 5 that goes up. Furthermore, its meaning, under any condition would be modified by the number of responses given in the record; by the relative number of the other location percentages; by the form level percent, and by numerous other contingent factors.

It is true, of course, that the Rorschach scores are not generally used in this isolated, independent manner. The importance of the total pattern in Rorschach analysis had been recognized by Rorschach himself when he first described the test. In the present study, it is assumed that the raters in the Q-technique adopt this approach in their analysis of the battery, and that it is represented in the ratings they have made.

## CHAPTER VI

## DISCUSSION: ANALYSIS OF TEST SCORES

1. Wechsler-Bellevue

The evaluation of the above results requires consideration of a number of factors. Our primary interest here is to discover whether there is a tendency for any of the scores to change consistently (and significantly) following lobotomy, thus pointing to the areas and functions of behaviour and personality which are modified. The first qualification is in connection with the learning factor, i.e., the influence of the repeated experiencing of the tests and the expected rise in scores as a consequence of the repetition. In our group, the post-operative test represents the third administration of all of these tests (for LZ and JD it is the fourth, since it is known that they had taken these tests prior to the pre-operative examination), and thus adds to the possibility that learning may account for improvement. In order to have some base line of the expected improvement on re-examination, we have presented for comparison purposes the scores found by Derner (340) in a "normal" group on re-examination at a six-month interval. Thus, we can have some figure by which to judge whether the increases found in our group are greater than those to be expected by virtue of re-testing alone.

Yet, the situation does not remain quite so unequivocal, for several reasons. First, as indicated above, the fact that this is the third administration for our group may justify the argument that the increases should be even greater than those found in Derner's second administration. Second, we can not really assume, as Derner can, that the pre-operative, or first score, represents the true baseline of the individual's achievement, against which to gauge subsequent improvement. Rather, the opposite is likely to be true, since we know that all of these patients were severely ill at the time of the first testing, so their scores would be depressed to begin with. With the easing of the illness we would expect a natural upsurge in the scores in the direction of the pre-morbid level, in addition to the increase accountable for by the learning factor. On the other hand, the very presence of the psychosis might itself have militated against gaining from the repeated exposures to the tests.

However, while it may be difficult accurately to evaluate the meaning of improved scores, the present situation is one which permits failure to improve, and especially decreases in scores, to be more clearly highlighted. Thus, inasmuch as we can expect scores to increase either by virtue of learning or because of an expected return to the pre-morbid level, absences of such improvement may be construed as impairment consequent to

lobotomy which might also be present.

Before any conclusions can be reached, though, it is necessary to examine the consistency and significance of the group trends. But, because the group is so small, it is difficult to apply meaningful statistical procedures to establish significance. We can, however, in view of the smallness of the group, examine the scores for consistency, simply by scanning. This latter was the basis of the presentation in the previous chapter.

Generally, it was seen that very few scores changed consistently for the entire group. In addition, the occurrence, in some instances, of wide ranges of change, contributed to the equivocality of the numerical results. The overall impression though, is that there appears to be some "restraint" operating, and that the increases are not as great or as consistent as might be expected. If this impression is correct, then it would appear as if the lobotomy does result in a generalized impairment of functioning, or at least in some kind of inhibition or constriction.

#### Total I.Q.

The above impression would appear to be corroborated on this score. The main impression is that, though there is no impairment of scores, nor is there any appreciable change in the direction of improvement. For the most part, the I.Q.'s remain just about the same, with at least a consistent

tendency to hold their own against lowering. Compared with Derner's mean increase of 6.2 points, the trend in our group would have to be interpreted as a failure to increase sufficiently. This may be due to one of several reasons: 1) the retarding influence of the lobotomy; 2) the failure to profit from learning experiences because of the psychosis; or 3) the continued presence of psychotic factors at the time of re-administration. Which of these is operating can perhaps be ascertained only from the qualitative data.

#### Verbal and Performance I.Q.'s.

The verification of the above general impression is furthered by these scores. Here we find more definite evidence for impairment, since a number of patients achieve scores below the pre-operative level. This is especially true in the Performance I.Q., where 4 of the patients show minus deviations. In addition, the heterogeneity is also more marked, since those that do improve approach very closely or exceed the mean cited by Derner. All that can be concluded, then, is that, for some reason, lobotomy results in the impairment of some I.Q.s, (verbal or performance), while others manage to hold up fairly well.

#### Vocabulary

This score presents an interesting picture primarily because of the relative absence of change. This would tend



to confirm the generally held view regarding the stability of this subtest. Since this appears to be true here, we have available a reliable baseline against which to evaluate the movement of the other, more vulnerable, subtests. However, whether this actually represents true stability (i.e., absence of any impairment), or whether it is limited to the more superficial or scored form, while qualitatively reflecting change (possibly, for example, in the direction of more concretistic definitions), cannot be determined at this point. However, by examining the qualitative responses, no marked differences between the pre and the post were seen.

#### Comprehension

The pre-V.D. column suggests that at the time of the first examination there was a fairly consistent impairment of judgment as measured by this subtest. The post-V.D. indicates that a trend toward improvement in this respect is present, and is corroborated by the I.D. column. While this may have been due to the effects of re-testing, the possibility may be tentatively considered that judgment is not as greatly impaired after the operation as it was before; and, with greater certainty, that lobotomy does not seem to impair those aspects of judgment as reflected by the scores of the Comprehension subtest. Offhand, we may think of this as the more superficial, stereotyped, and conventional forms

of behavior, in which our patients now show greater appropriateness and adequacy than they had before the operation.

#### Information

Very little change is seen here. Neither before, nor after the operation does the functioning represented by this subtest seem to be much affected. While the mean improvement here remains very small, Derner's mean is also relatively small, so that it is to be concluded that remote memory is not affected. This subtest is one of the most stable in the group.

#### Digit Span

Insofar as this subtest is an index of the anxiety that is present, it appears that there is no appreciable diminution in the anxiety level following the operation. Both the pre- and post-operative V.D. scores are striking for their consistency in remaining below the Vocabulary level. Although there are minor increases in the I.D. in four of the cases, this score remains depressed. The same conclusion holds, of course, if we consider this a test of recent memory.

#### Arithmetic

The results here indicate that, if anything, there is a tendency for greater impairment in this subtest than was true before the operation, suggesting that concentration does suffer as a result of lobotomy.

### Similarities

Here we find that in a test purported to measure concept formation there is the most consistent trend to improvement (along with Block Design) of all the subtests. It is true that the scores, as seen in the Post-V.D. column are still generally at or below the Vocabulary level, there is nevertheless a great deal of recovery from the impairment present during the pre-operative, psychotic state. Reasoning directly from the psychological rationale attributed to this subtest, we are led to conclude that a relative improvement in concept formation occurs following lobotomy.

### Picture Arrangement

Here, too, we find a situation not in keeping with a generally held view regarding lobotomy. Though not as clearly as in the case of Similarities (above), or Block Design (below), there is more of a tendency toward improvement here than is seen in other subtests. Although it is noted that this score is apparently depressed both before and after the operation, indicating continued difficulty in planning and anticipation, presumably as a concomitant of the psychosis, it is also seen that this impairment is not as great as it had been. Pertinently, it may be expressed that, judging from this subtest, lobotomy does not seem to result in impaired planning ability. On the other hand, it should be

noted that the expected increase as seen by Derner's figures is also greater on this subtest than it is for the others except Object Assembly.

### Block Design

On this subtest we find a situation that is by far the most striking. Like in Similarities, we note a fairly consistent improvement in the I.D. column. In addition, we note that this improvement carries the scores in a total of five cases (as compared with 2 cases preoperatively) to a level above vocabulary, and that the mean improvement here is 1.4 points, as compared with Derner's mean of 1.0. On the basis of the numerical data alone, and supported by the findings for the Similarities subtest, we are led to conclude that concept formation and certain aspects of perceptual organization and synthesis do not suffer following lobotomy, and certainly suffer less than other functions represented by these subtests. As an indicator of organic brain damage, this subtests fails to suggest the imposition of such damage following lobotomy.

### Picture Completion

The patterns in the pre-and post-V.D. columns remain essentially the same, with most of the scores remaining below the vocabulary level. In terms of relative change, the I.D. column remains equivocal. In terms of the

psychological meaning, no consistent trend is suggested regarding acuity of perceptual functioning and its related function of concentration, with the initial impairment remaining about the same.

#### Object Assembly

Very little tendency in any direction, and no consistency, is noted here. In terms of the visual-motor functioning represented by this subtest, with a secondary speed factor, no definite conclusions for the group as a whole can be made.

#### Digit Symbol

The lowering of this score that appeared preoperatively is not much changed, with perhaps a slight tendency towards greater impairment post-operatively. At any rate, we may say that whatever factor was present to depress the visual-motor coordination and the possible related learning factor, has not been relieved by lobotomy. It is, of course, possible that at the same time that the psychotic factors were relieved, new factors, perhaps those related to organic brain damage, - entered to keep this score down. Conjectural as this may be, it is an indicator of the difficulty inherent in the interpretation of these scores.

#### Summary of Results

Perhaps the most important conclusion to be drawn from

these findings is that the meanings remain essentially ambiguous and conjectural so long as we are limited to the numerical, quantitative data, - the scores. In addition to the limitation imposed by not being able to apply statistical procedures to this small group, we are further hampered by not finding any really consistent trends. Even where there is relative consistency, the alternative considerations and explanations further limit the meaningfulness of the quantitative data by itself.

Nevertheless, some tentative observations might be made:

1. The I.Q. scores fail to increase sufficiently, suggesting either an inhibition imposed by the lobotomy, or the continuance of the psychosis, or the replacement of the psychosis-determined impairments by lobotomy-determined impairments.
2. Vocabulary remains essentially unchanged, more so than any other subtest, consistent with the general findings regarding its stability.
3. The two subtests most consistent in change are Similarities and Block Design, both of which improve especially in contrast to the other subtests.
4. In terms of the I.D. alone, we find the following:
  - a. Some tendency to improvement:
    - Comprehension (conventional judgment)
    - Picture Arrangement (planning and anticipation)

- b. Some tendency to impairment:
  - Digit Symbol (visual-motor coordination and learning).
  - Arithmetic (concentration)
- c. Equivocal or no change
  - Digit Span (anxiety, remains low)
  - Information (remote memory)
  - Picture Completion (acuity of visual perception)
  - Object Assembly (visual-motor coordination)

5. In view of this total picture, no definite conclusions regarding changes in functioning following lobotomy can be reached from the quantitative data presented. A number of conjectures or hypotheses suggest themselves, but it is plain that these can possibly be verified only by the examination of the qualitative data.

## 2. The Sorting Test

Before discussing the specific results found on this test, a few comments regarding the nature and function of this test will be made.

From a logical point of view, concept formation is an essential aspect of thinking, as Rapaport (254, Vol. I, pp. 385-393) points out in great detail, involving the essential functions of memory, and of attention, concentration, and anticipation. It follows that impairment in concept formation is usually an indication of the encroachment of maladjustment on the thought processes, hence an indication of and concomitant with psychopathology.

More specifically, the Sorting Test "reflects concept formation proper to conscious ordered thinking," and "pertains to concept formation as exercised every day by the human being of our civilization." It tells also how a person "sees the segments of the world of objects, and the interrelationships in it, which surround him daily." (254, p. 398) This kind of concept formation is essential in everyday functioning, because the appropriate evaluation of objective reality, from the point of view of judgment and from the point of view of action requires it. In the course of normal, adequate functioning we do this automatically. In our perception of the reality world around us we spontane-



ously categorize and order the objects, - and events, - with which we are confronted. Hence, for the optimum adjustment to the world there is an optimum ideal as to the level on which we make these categorizations. There is also an optimum degree to the inclusiveness of our categories, for being too broad and inclusive, or too narrow and limited, are both conducive to defective or inadequate functioning.

The Sorting Test is considered by Rapaport (pp.398-399) to be a more sensitive test of concept formation than is the Similarities subtest of the Wechsler-Bellevue. He is also of the opinion that it is more "vulnerable to maladjustment." This is the case because of the numerous properties which are concretely before the subject, which makes him more prone to bog down among the many attributes which the objects possess. Another factor which contributes to the relative importance of these results is the close relationship of the scores to the actual test data. More than in any other test, these scores represent the essence of the test; in fact, one can hardly think of the responses without mentally converting them into the various categories represented by these scores. It is, of course, true, as in the other tests, that there are additional, "qualitative" factors, such as the nature of the verbalizations, the manner of approach, the modes, - ranging from freedom, promptness, and facility,

to perplexity and total impotence. These are factors which are common to all tests, but the Sorting Test, by virtue of its unique structure and function, rests much more heavily on the tabulated scores than do the others.

Further distinctions are observed on this test, between the active and the passive parts. Rapaport notes that the active concept formation becomes accurate earlier in the individual's development than does the passive part, but that it remains "more primitive in its conceptual level." He sees the active sorting as representing a more "subjective" experience; while the passive concept formation requires the subject to "meet the logical ideals of our society, which requires highly conventionalized concepts in harmony with the conceptual standards of our society."

The results of the Sorting Test appear, at first glance, to be more definitive and more striking than is true for the scores on the other tests. It is of special interest that the change seen is in the general direction of "improvement" in concept formation.

Rapaport notes (p.439) that approximately half the responses on Part I, and two-thirds on Part II, should be on the CD level; otherwise we have an indication of "impairment." We see, then, that by these standards, the pre-operative CD (48%) on Part I was not impaired, and that the

post CD 67% is a definite increase. This is supported also by comparison with the CD of the Control (46%). On Part II, however, the pre CD is below this standard (51%), but achieves the "non-impairment" level after the operation (63%). Again, this is confirmed by comparison with the Control CD (70%). This Discrepancy as well as the observed "improvement," between the two parts may be understood in the light of the distinction Rapaport makes between the active and the passive sorting, and the general discussion above of the function of this test. This will be elaborated below.

The next major finding is the considerable decrease, on both parts, in the number of items failed. At the same time there is, on Part I, a diminution in the number of Narrow scores, with a concomitant increase in the number of Loose. On Part II the increase in the number of S scores may be considered the parallel trend to the loosening on Part I. (Rapaport points out (p.444) that loose sortings and S definitions are "two aspects of the same disturbance.")

We find, then, three major indications of "improvement":

1. Increase in CD
2. Increase in Adequate scores
3. Decrease in number of failures.

In addition, the decrease in the number of FD on Part I,

and in the number of Fab on Part II, are both consistent with the improvement, since it is these scores which were replaced by the CD's.

In view of this trend we may certainly conclude that concept formation is not impaired by lobotomy. However, we may go even further, and say that lobotomy apparently makes possible a higher level of concept formation than was manifested by these patients pre-operatively, during the illness. The first conclusion is especially relevant here, inasmuch as we are dealing also with organic brain damage, which was imposed by the lobotomy, and was not present at the time of the pre-op testing. Since impairment in concept formation is a common occurrence in the presence of brain damage, it is important to make clear that no such observable defects are introduced by this neurosurgical procedure. In regard to the second conclusion, then, we may interpret these findings as indicative of the diminution of the psychosis, as would be consistent with the above discussion of the function and significance of concept formation in every-day adjustment and in reality contact. Thus, this change marks the relative departure from the psychotic characteristics of withdrawal, self-preoccupation, and minimum involvement with outside matters. More effort is expended, as seen in the fewer failures, and there is a gen-

eral restoration of contact and interrelationship with the non-personal outside world. At the same time, as seen in the decreased Narrow, and increased Loose and S responses, there is a diminution in the inhibition, constriction, caution and rigidity, replaced by greater freedom, fluidity, and participation. In general, these patients are now better capable of dealing with the world around them; can more appropriately and adequately organize the details of their everyday life; and their judgments about objective reality are not as much disturbed by the limitations of the mental illness as was true before the lobotomy.

On the other hand, it is also possible to consider the increased looseness, and especially the markedly increased S, as pathognomonic. We are forced to consider this possibility in view of Rapaport's finding (p.444) that a massing of S scores on Part II is a "malignant indicator." We can only conjecture about this, and suggest that, despite the observation of general improvement, we are still likely to find vestiges or manifestations of the long-standing psychosis, since it is not expected that the psychosis would be entirely dispelled by the operation. Just why it is manifested in this particular form is not clear. We might also speculate that any organic damage that may have been introduced is represented by this score.

There are also other factors mitigating the initial impression of striking improvement. One of these is suggested by the discrepancy between the changes on the two parts of the test. In terms of the distinction described above, we would have to conclude that the greatest improvement occurs on the active part of the test, the part that remains on a more "primitive" level and represents the more "subjective" experiences; while in the passive part, which is more indicative of the social conformity, we do not see as considerable improvement, and at the same time we note the possible pathognomonic massing of S responses.

Further mitigation of these striking findings turns up on examination of the consistency with which these changes occurred within the entire group. While we find confirmation for the consistent improvement, especially in regard to CD and Fail, on Part I, we find the changes on Part II to be much more equivocal. It is also interesting that on Part II the most consistent change is in the increase in the number of S responses.

In summary, it appears that though there are indications of improvement in concept formation, they are not completely consistent, nor can they be considered without qualifications.

### 3. Proverbs

It was seen that the nine patients fell into three different groups as reflected in their performance on the Proverbs. It is difficult to understand the reason for this discrepancy in achievement, and we are left only to conjectures. Under any conditions, it is well to keep in mind the possibility that the individual personality differences are here more clearly represented, even if the reasons for the variations are not apparent.

The group of three patients (H.P., B.C., R.M.) who showed the most impairment seem to have three factors in common. One is that they are not schizophrenic; two, that impairment was already noted pre-operatively; three, that they are all of relatively advanced age (48, 51, and 54, respectively). Since the pre-operative impairment was definitely not due to schizophrenic interference, it may be conjectured to account for this impairment that some brain damage was already present, -- possibly due to a process of senile deterioration, -- especially in view of their ages. It may be that the lobotomy exacerbates the already failing abstract functioning as represented by Proverbs.

In contrast, the two patients whose Proverbs improved (K.H., M.M.), were both schizophrenic, the influence of which is seen in their responses. However, both these patients

improved clinically (sufficiently to be discharged from the hospital), and it would seem that this improvement is reflected in their performance on the Proverbs. On the other hand, the two (J.D., E.Z.) who showed no change in respect to schizophrenic intrusion in their responses, are the only two patients in the group who have not improved, and the only two of the entire group who are still in the hospital.

As for the remaining two (L.Z., T.B.), The situation is much more conjectural. Both are over fifty, but neither showed any definite indications of organicity prior to the operation, as reflected on the Proverbs. Nor did either exhibit the schizophrenic disturbances of thought prior to operation (although T.B. was diagnosed as a paranoid schizophrenic, the chief symptomatology was that of a systematized paranoia in a context of very good preservation). It is possible, then, that the mild tendencies to looseness and concretism come as a consequence of lobotomy.

It becomes clear, however, that from the examination of the Proverbs alone no consistent tendencies for this small group of lobotomy patients could be discerned. It is also apparent that it would be impossible to formulate the above observations and conjectures except in the comparative framework that is employed, and that further light is shed only by reference to some of the details in the clini-



cal history, on an individual basis.

Finally, although there are some findings which appear to be interesting, we are limited in our understanding and evaluation of these observations. Very little work exists in the published literature on this test, but it certainly seems that it deserves a great deal more of study and research. At this point it can only be said that it promises to contribute to our understanding of abstract functioning, and may well prove to be a sensitive diagnostic tool for brain damage and other psychopathologies.

#### 4. Summary and Conclusions

The reason for including the analysis of the scores in the present study was to evaluate the extent to which such quantitative data was useful, and the nature of the results derived from it.

It was seen that, for the most part, the test scores did not point up any definitive or consistent findings. Part of this can be attributed to the small size of the group, because it is possible that a larger sample might have shown specific trends. A major obstacle arises in the difficulty encountered in interpreting the trends that are observed, a difficulty inherent in the complexity of the situation found here. In addition to the issue of learning, we have also to deal with the complicating factors of psychosis, lobotomy, organic brain damage, and individual differences. On the other hand, an advantage was present in the opportunity to compare the post-op scores with the baseline pre-op scores.

Of special interest, and apparently with some significance, is the finding in relation to concept formation. On the Wechsler-Bellevue, the two subtests definitely outstanding in regard to "improvement" are Similarities and Block Design, both considered to be related to concept formation; and on the Sorting Test, where a striking consistency

was noted in the increase in the number of conceptual definitions (CD). It would appear that we have some justification in concluding that concept formation is certainly not impaired by lobotomy. Furthermore, we have grounds to assert that the nature of the improvement consequent to lobotomy is related to the psychological functions represented by these tests of concept formation.

If, as seems reasonable, the Proverbs test is to be included under the heading of tests of concept formation, we find here a distribution which is definitely equivocal. An attempt was made to speculate about these differences, primarily in terms of individual differences of the patients, but there was not any clear evidence to support these conjectures. It was also suggested that a greater degree of clarification of the discrepancies could be approached by virtue of comparative qualitative analysis. The discrepancies, both inter-patient and inter-test, suggest that it may be of value to study this test more extensively, both for purposes of standardization and for better understanding of its functions and rationale.

There were some suggestions on the Wechsler-Bellevue that, though improvement did occur, since the scores generally went up, they did not go up as much as would be expected if we take Derner's study as a standard. This failure to

improve, or to benefit by learning, may be attributed to the continued presence of psychotic factors, or to the introduction of new interferences as a consequence of the lobotomy.

The issue of "learning" remains a puzzling one, with many unanswered questions remaining. Can we expect psychotic patients to benefit from learning as much as non-psychotic subjects? How much of any observed increase in scores of our patients is to be attributed to learning, and how much to restitution of pre-morbid levels accompanying the diminution of psychosis? In the case of lobotomy, is it possible that there are lobotomy-induced defects which tend to restrain improvement that would otherwise occur with lessening of psychotic factors? Moreover, is it always a simple "Learning factor which is involved in re-testing? For example, can the increases in Digit Span scores be considered "learning"? Certainly, it does not seem likely that after six months has elapsed the subject remembers, or has "learned," the numerals in the series, in the same way that he might, for example, remember what the objects in the Object Assembly subtest represent. There might, therefore, be another factor operating, which may come under the heading of familiarity, or experience, in a much more general way, which accounts for the better adjustment to the second test situa-

tion, which is no longer new and threatening. It is also possible that the learning is an erratic factor, since it may influence some areas but not others, and which may occur only in some places for some patients.

Finally, although individual scores may be found which change consistently, it is seen that the full meaning remains elusive as long as we are dealing with them in isolation. A more complete approach would be to use the scores as cues and clues which point to suggestions that can be followed up in the qualitative analysis. It should be emphasized, however, that by qualitative analysis is not meant simply examining the verbalizations for each individual subtest. Rather, it involves dealing simultaneously with all the nuances that the clinician is capable of picking up and weighing them, comparing, contrasting, organizing, eliminating and conjecturing in order to build up a logical, psychologically valid, unified picture. It is for this reason that the Q-technique is considered to be an important method in clinical research.

## Chapter VII

### Results: Q-technique

#### 1. The Intercorrelations

The correlations between the raters were obtained by the formula

$$r = 1 - \frac{\sum(d^2)}{302}$$

where  $d$  is the difference between two ratings on any single item, or trait. The higher the obtained  $r$ , the greater is the similarity, or degree of commonality, between the two correlated.

A total of 72 correlations were obtained. Thirty-six of these represent the total number correlations of all the pre-operative ratings with each other, and 36 of all the post-operative ratings with each other. In each case, the initials of the patient are preceded by either an A or a B, the former indicating a rating made on the basis of the patient's pre-operative tests, the latter on the basis of the post-operative tests. The intercorrelations are presented in Tables 7 and 8.

One of the major aims of this study is to determine whether changes following lobotomy can be discerned by means of psychological tests. In this connections, reference was made, (above, in the chapter IV), to the assumption that the

Table 7

Intercorrelations of All Pre-op Ratings With Each Other

	AHP	ABC	AEZ	ARM	AKH	AJD"	ATB	ALZ"	AMM
AHP									
ABC	.33								
AEZ	.21	.46							
ARM	.42	.53	.54						
AKH	.25	.44	.51	.62					
AJD	.13	.56	.52	.25	.28				
ATB	.11	.42	.61	.46	.37	.69			
ALZ	.02	.38	.58	.47	.40	.46	.54		
AMM	.28	.40	.49	.45	.62	.43	.53	.57	

Table 8  
Intercorrelations of All Post-op Ratings With Each Other

	BHP	BEC	BEZ	BRM	BKH	BJD	BTB	BLZ	BMM
BHP									
BEC	.47								
BEZ	.44	.54							
BRM	.62	.34	.36						
BKH	.48	.36	.24	.32					
BJD	.29	.50	.29	.28	.37				
BTB	.17	.49	.42	.16	.33	.59			
BLZ	.22	.42	.40	.05	.38	.32	.39		
BMM	.19	.20	.19	.30	.46	.35	.36	.26	



ratings of the group of patients would be less alike (more individualized or heterogeneous) after the operation than they were before, and that this would follow only for the psychotic patients, but not for HP, the patient with intractable pain. In his case, the converse should be found: less similarity with the pre-group than with the post-operative group, since he was not selected on the same basis as was the psychotic group. In view of this, the ratings of HP were eliminated in computing the group means.

In order to examine the premise that the group changes after lobotomy in regard to homogeneity, the means of the two groups of correlations are compared. On the Pre-Pre correlations, a mean of .485 is obtained, when the rating of HP is excluded. With HP the mean goes down to .425. On the Post-Post, the mean  $r$  is .345, without HP; with HP it is .348.

The correlations of each patient's pre with his own post yield a mean of .47, without HP; with HP it is .45.

These figures suggest the following:

1. Greater similarity exists between the pre-pre ratings than is true among the post-post ratings.

2. The pre-pre  $r$ 's indicate that HP contributes to dissimilarity at this point, as is seen by the higher

correlation among members of the group when HP is not included.

3. As may be expected, the mean correlations of each patient's pre with his own post is definitely higher than his post correlated with all the other posts.

It is recognized, however, that the statistical significance of these means cannot be ascertained, as for example by the *t* test, inasmuch as these ratings are not independent. In order to check on the significance of these apparent differences, *t* tests were run in the following manner. The mean of each patient's pre-op correlations with all the other pre-op ratings was compared with his own mean of his post-op correlations with all the other patients' post-op ratings. The *r*'s were converted to *z*'s for this purpose.

The results of the *t* test, with the accompanying means, are listed in Table 9 below.

Table 9  
Mean Intecorrelations of Pre-Pre and of Post-Post Ratings.  
Results of *t* Test

Patient	Pre-Pre	Post-Post	Difference	<i>t</i>	<i>P</i>
HP	.22	.36	.14	3.64	.01
BC	.46	.41	-.05	0.89	.40
EZ	.53	.35	-.18	3.98	.01
RM	.47	.26	-.19	4.67	.01

Table 9 (Cont'd)  
Mean Intecorrelations of Pre-Pre and of Post-Post Ratings.  
Results of t Tests

Patient	Pre-Pre	Post-Post	Difference	T	P
KH	.46	.35	-.11	2.15	.10
JD	.46	.39	-.07	2.09	.10
TB	.52	.39	-.13	2.95	.05
LZ	.46	.32	-.14	2.62	.05
MM	.50	.28	-.22	5.82	.01

It is seen that changes in the direction of less similarity after the operation are as follows: In the case of four patients the difference is statistically significant at the 1% level of confidence; two are significant at the 5% level; two approach significance at the 10% level; and one seems definitely not significant. The degree of freedom for these figures is 7. The formula for t is based on McNemar (342, p. 225), for the difference between correlated means.

It should also be noted that while the direction for the entire group is towards less similarity (smaller r's after the operation than before), the situation with HP is just the opposite, finding for him a mean of .22 in the Pre-Pre, as compared with .36 in the Post-Post.

At this point the question arose as to whether there might have been a bias on the part of any of the raters, since they were aware that the tests they rated were those of lobotomy

patients. The question, as formulated, was whether the ratings were actually made on the basis of the tests, or whether they were subtly determined by the prejudgments consequent to the knowledge that the patients were in some way connected with lobotomy. Towards this end the "ideal" ratings, as described above, were carried out. (Eight of the original raters, four who had rated a pre-operative record, and four who had rated a post-operative record, were asked about two months after the original rating to sort the same traits in terms of the personality of a patient who in their opinion was an ideal candidate for lobotomy).

When these eight ratings were obtained, they were correlated with each other, and these  $r$ 's compared with the  $r$ 's that the same two raters obtained in the original experiment. (See Table 10).

Breaking down these data into various categories, we find the following differences occurring between the ideal and the original means of the same raters:

1. Total group (all eight ideal ratings with each other; 28  $r$ 's)

Ideal Mean ----- .51  
Original Mean -- .46

This suggests that these eight raters found more in common when rating an ideal patient, than when rating different pre-operative and post-operative patients.

Table 10  
Intercorrelations of Ideal Ratings With Each Other, With  
Comparison of Original Ratings

	BTB	BLZ	BBC	BJD	ALZ	ABC	AEZ	ARM
BTB	(59)							
BLZ	68 39	(58)						
BBC	59 49	67 42	(49)					
BJD	32 59	39 32	47 50	(28)				
ALZ	35 36	54 63	44 44	45 30	(39)			
ABC	69 48	68 50	57 50	27 47	41 38	(51)		
AEZ	42 43	58 45	57 52	47 48	45 58	56 46	(38)	
ARM	53 45	64 33	61 65	33 31	35 47	60 53	54 54	(26)

Note: The figures in parentheses represent correlation of ideal ratings with ratings of original by same rater.

The upper figure represents the intercorrelation between two ideal ratings; the lower figure is the original correlation between these two raters.

2. Pre-op raters (four raters who had originally evaluated pre-operative patients; 6 r's).

Ideal Mean ----- .48  
Original Mean --- .49

These figures would suggest that there is little difference between what is considered an ideal patient and the way the pre-operative patient was seen.

3. Post-op raters (four raters who had originally evaluated post-operative patients; 6 r's).

Ideal Mean ----- .52  
Original Mean --- .42

Here is found a greater disparity, suggesting that the post-operative patient was less like the ideal than was the pre-operative patient.

4. Self (correlations of each ideal raters sorting with his own original sorting; 8 r's).

Total group ----- .44  
Pre-op raters (4)- .49  
Post-op raters(4)- .39

This appears as further support for the above, as suggesting that the actual post-op ratings were less like the idea of the same raters' ideal patients than was true of the pre-op ratings.

The eight ideal ratings were also correlated with all the original (18) ratings, and these r's are listed in Table E

in the Appendix. Following are the means of the various groups of correlations:

1. Correlating all of the ideal ratings with all of the pre-op ratings, we obtain a mean of .44, when HP is excluded; .40 when he is included. This is compared with the original correlations obtained between the 8 ideal raters and the total pre-op group, getting a mean of .48 without HP, a mean of .46 with him.

2. Carrying out the same procedure with all the original post-op ratings, we get a mean of .38 without HP, .36 with him. Compared with the original correlations, we find means of .40 with, and without, HP.

These figures suggest essentially the same pattern that was seen in the correlations discussed directly above: the tendency for the ideal ratings to be more like the pre-op ratings than like the post-op ratings.

In examining the means for the individuals, as seen in the horizontal rows in Table E it is seen that the general tendency noted for the entire group is reversed in the case of HP. The mean correlations of the ideal with the pre-HP is .11, whereas the correlations of the ideal with the post-HP yield a mean of .26. This would further support the contention that HP did not share with the other 8 patients the usual characteristics of the ideal lobotomy patient.

In the horizontal rows we see also that a similar reversal, albeit small, occurs in the case of TB, from .46 pre, to .49 post. The reason for this, however, is not apparent.



## 2. Item-Analysis

The statistical analysis and examination of inter-correlations have demonstrated, with a fair degree of certainty, that changes do occur in patients following lobotomy, as seen on psychological tests. At this point, then, two questions present themselves:

1. Is there a general tendency for the change to be in any particular, discernible direction? More specifically, in addition to knowing that the patient's change, and that they are less alike after lobotomy than they were before, do we have evidence to indicate whether they get better or worse, or remain unchanged in regard to pathological conditions?

2. In what specific aspects of the personality do they seem to change most? In which respects do they improve, and in which do they become worse, or fail to change?

In order to answer these questions, various approaches to item analyses were attempted in an exploratory way. Because of the small size of the group, however, an examination technique was considered most feasible.

Each of the items in the trait universe was assigned a score of plus or minus, to differentiate the "positive" personality characteristics from the "negative" ones. Thus,

the item He is a withdrawn, fantasy ridden person, is a minus; while He reaches the goals he sets for himself, is considered to be a plus item. (All of the numbered items are listed on Table A in the Appendix). In the ratings, then, when a minus item becomes more salient (plus times minus) we say that there is additional impairment, since the negative characteristic is now more applicable than it was before; and when the minus item is rated as less salient (minus times minus), we assume that this reflects improvement. In the case of plus items, greater saliency denotes improvement; less saliency, impairment.

As a gross indication of the direction of the change, the various items were weighted in the following manner. Those items placed under columns 8, 7, 6, 5, on the rating chart, (see Appendix, Fig. 1), with 8 being the most salient, 7 next most salient, etc., were given weights of  $+4$ ,  $+3$ ,  $+2$ , and  $+1$ , respectively; and those placed under columns 1, 2, 3, 4, (where 1 is the most non-salient, etc.), were assigned values of  $-4$ ,  $-3$ ,  $-2$ , and  $-1$ , respectively. Now, if a minus item appeared under column 8, the most salient, the weight would be  $-4$ ; if a plus item appeared under column 7, the weight would  $+3$ . On the other hand, if a minus item appeared under column 1, the weight would be  $+4$ ; and if a plus item appeared under column 2, the weight assigned was  $-3$ . All of

these weighted values were then algebraically totalled, and the result of this manipulation is presented in Table 11, below.

Table 11  
Algebraic Sums for Weighted Values of all Ratings

Patient	Pre	Post	Change
HP	- 32	- 62	- 30
BC	-104	-100	/ 4
EZ	- 88	- 70	/ 18
RM	- 90	- 90	0
KH	- 82	- 68	/ 14
JD	-108	- 90	/ 18
TB	-100	- 96	/ 4
LZ	- 76	- 56	/ 20
MM	- 80	66	/ 14

Here it is seen that, with the exception of RM, all of the psychotic patients improve, although the magnitude is not very considerable. Significantly, and consistent with the other findings, HP's change again goes in the opposite direction, with a post-op total of -62, as compared with his pre-op total of only -32. This change is suggestive of impairment following the lobotomy. The relative figures of all of the patients pre-operatively, as compared with the total of HP, suggests also that the pre-operative condition of HP was much better than the pre-operative condition of the rest of the patients.

When the same procedure was applied to the ratings made of "ideal" candidates for lobotomy, the following eight totals were obtained:

ARM	-84	(-90)
ABC	-98	(-104)
ALZ	-60	(-76)
AEZ	-72	(-88)
BBC	-88	(-100)
BJD	-42	(-90)
BLZ	-106	(-56)
BTB	-102	(-96)

The letters on the left of the figures refer to the "ideal" raters, in terms of the patient whom they had originally rated, the prefix A indicating the pre-operative record, the B, the post-operative record. The second column lists the sums on the ideal rating; and the figures in the parentheses are presented for purposes of comparison, being the sum obtained on the same rater's original sorting.

To compare the ideal judgments with the original, the means of the three groups excluding HP, are as follows:

Pre	-91
Post	-79
Ideal	-82

On the whole, the patients were judged to be, before the operation, somewhat worse than lobotomy candidates are "ideally" expected to be, although they are a little better after the operation than are the members of the "ideal" group.

To ascertain more specifically which of the items changed most after the lobotomy, attempts were made to apply such methods which would add statistical support. It was

found, however, that because of the size of the group, such a procedure as, for example, obtaining the standard deviation for each item at each testing interval, is minimally valuable. In view of the smallness of the group, then, it was considered that inspection techniques would be most feasible for the present purpose.

In order to evaluate these changes more accurately, the problem was approached in terms of finding the items most improved and those most impaired. This analysis was done twice: once, in terms of consistency, i.e., those items which, in the total group of eight, most often improved or were most often in the direction of impairment; second, in terms of magnitude, i.e., the items which obtained the highest algebraic sum when the movement for the whole group was added up. In addition, a tabulation was also made in terms of absolute change, i.e., those in which the greatest movement, or change is found, regardless of direction, (plus or minus signs being ignored), as well as of those which remained equivocal, or relatively unchanged.

Table F in the Appendix lists the changes on each item, for each patient. This table provides the basic data for the item-analysis.

Table 12 gives the distribution of all the items in terms of both improvement and impairment, for magnitude. Thus, under  $\neq 9$  we find items 39 and 69. Checking back with

Table 12

Distribution of Items Improved and Impaired in Terms of Magnitude

Amount and Direction of Change	Items
-7	20; 55; 73.
-6	
-5	3; 10; 48; 72.
-4	16; 23; 53.
-3	18; 47; 58; 67.
-2	12; 19; 28; 32; 41; 56; 59; 61.
-1	11; 26; 34; 42; 46; 64.
0	1; 2; 40; 51; 60; 76.
+1	7; 17; 31; 36; 50; 63; 70; 74.
+2	5; 14; 30; 37; 43; 62; 71.
+3	4; 13; 21; 24.
+4	9; 22; 38; 45; 52; 57; 68.
+5	6; 29; 35; 66.
+6	27; 44; 65; 75.
+7	25; 49; 54.
+8	8; 15.
+9	39; 69.

Table F in the Appendix it is seen that the algebraic sum of the changes in all eight patients for this item is 49. In this way a distribution for the items is obtained, ranging from minus seven to plus nine. The items at either extreme are considered to be those which are most improved or most impaired. The eleven items most improved are listed in Table 13. The eleven most impaired are listed in Table 14. Finally, those items that are found, on Table 12 to be at, or closest, to zero, may be considered to be those which have changed least in terms of magnitude. These are listed on Table 15.

When considered from the point of view of greatest change or movement, regardless of the plus or minus sign, we obtain an array as presented in Table 16. Table 17 lists the 15 items most changed in regard to absolute magnitude; and Table 18 lists those which are least changed.

To isolate the items which changed most consistently, the following procedure was carried out. One card was made for each item, and on it were placed the eight changes (for each of 8 patients) found for that item, as seen on Table F. Some items, for example, had six plusses, one zero, one minus; or five minus, two zero, and one plus; and so on. The entire group of 76 cards was then sorted first into three categories: those which had a majority of plus scores; those with a majority of minus scores; and those which were equivocal, i.e.,

Table 23  
Items Most Improved in Terms of Magnitude

- 39. There is an autistic quality to his thinking, reflected in such things as fabrications, confabulations, neologisms, or contaminations.
- 69. Everything seems all right to him.
- 8. He is generally over-compliant in his interpersonal relationships.
- 15. He has feelings of unreality about the world around him.
- 25. He tends to organize his perceptions in an adequate (not arbitrary) manner.
- 49. He is capable of prolonged attention and deliberativeness.
- 54. The efficiency of his integrative ability remains adequate even under the impact of anxiety.
- 27. He is capable of expressing ideas clearly and adequately.
- 44. He suffers from a persisting anxiety state of the dull, oppressive, free-floating, restless, vaguely uneasy variety.
- 65. He has feelings of worthlessness and despair.
- 75. He has feelings of guilt.



Table 14

Items Most Impaired in Terms of Magnitude

- 20. His behavior is stereotyped and perseverated.
- 55. He has no difficulty in shifting attitudes; (a flexibility of mental sets), e.g., to accept new elements into previously established groups.
- 73. He is tactful; He is not outspoken or overly candid.
- 3. There is warmth in his affect.
- 10. He likes and trusts other people.
- 33. He tends to be self-centered, narcissistic in his thoughts and actions.
- 48. A weakness of anticipations is apparent, so that foresight, or projecting into the future is impaired.
- 72. He manifests inertia, or lack of drive.
- 16. Psychomotor and/or ideational retardation is evident.
- 23. His aggression is likely to be absorbed in fantasy.
- 53. Emotional responses are free and flexible.

Table 15  
Items Least Changed in Terms of Magnitude

1. He believes that his behavior and/or thinking are being influenced by outside forces. (Paranoid ideas of influence).
2. He applies his assets constructively or creatively.
40. Memory for recent events is impaired.
51. Compulsive circumstantiality (of a paranoid nature) is seen.
60. He has a capacity for active, creative fantasy.
76. He is irritable.
7. He is capable of admitting aggressive feelings; they are not likely to be pent-up.
17. He has a positive orientation in his relationships with other people; he is warm, sensitive, emphatic.
31. He learns quickly.
36. He is capable of reflection and appropriate self-criticism.
50. He is capable of coping with affects when they must be faced.
63. He is not disturbed by, or concerned with what ought to be problems to him.
70. He is deficient in planning capacity, enterprise.
74. He copes adequately with anxiety-arousing situations.
12. He is an ideationally active person.
19. The effectiveness of his thinking is reduced by indecisiveness and/or doubting, and/or rumination.
28. Feelings of aggressiveness and hostility interfere with interpersonal relationships.
32. In interpersonal relationships he is likely to become a-

vasive or suspicious.

41. His thinking reflects circumstantiality, i.e., he does not keep out statements or details which are unrelated to the central issue.
56. His concentration is impaired.
59. There is a tendency to "excitement" in mood; he reacts with strong feeling.
61. He has feelings of helplessness and inadequacy.

Table 16

Distribution of Items in Terms of Absolute Magnitude of Change

<u>Amount of Change</u>	<u>Items</u>
15	10; 33.
14	8; 38; 44; 59; 62.
13	3; 7; 25; 29; 39.
12	30; 57; 76.
11	13; 17; 36; 42; 58; 66.
10	5; 15; 22; 26; 27; 51; 56.
9	6; 20; 21; 24; 49; 54; 55; 69; 73.
8	2; 9; 14; 19; 23; 28; 32; 43; 61.
7	34; 35; 48; 63; 67; 70; 72.
6	1; 12; 37; 52; 53; 65; 68; 71; 75.
5	4; 11; 18; 31; 46; 47; 64; 74.
4	16; 40; 41; 45; 60.
3	50.

Table 17

Items Most Changed in Terms of Magnitude

10. He likes and trusts other people.
33. He tends to be self-centered, narcissistic, in his thoughts, and actions.
8. He is generally over-compliant in his interpersonal relationships.
38. He is capable of grasping complex relations, e.g. to organize and synthesize parts into a meaningful whole.
44. He suffers from a persisting anxiety state of the dull, restless vaguely uneasy variety.
59. There is a tendency to "excitement" in that he reacts with strong feeling.
62. His affect has depth,--it is not shallow.
3. There is warmth in his affect.
7. He is capable of admitting aggressive feelings; they are not likely to be pent-up.
25. He tends to organize his perceptions in an adequate (not arbitrary) manner.
29. He is anxious, fearful, or uncertain about what the future will bring.

Table 17 (con't)

Items Most Changed in Terms of Magnitude

39. There is an autistic quality to his thinking, reflected in such things as fabrications, confabulations, neologisms, or contaminations.
30. Homosexual impulses or conflicts are central.
57. Judgment is adequate; he recognizes the appropriate responses and acts on it without undue delay or unnecessary impulsivity.
76. He is irritable.

Table 18

Items Least Changed in Terms of Absolute Magnitude\*

- 50. He is capable of coping with affects when they must be faced.
  - 16. Psychomotor and/or ideational retardation is evident.
  - 40. Memory for recent events is impaired.
  - 41. His thinking reflects circumstantiality, i.e., he does not keep out statements or details which are unrelated to the central issue.
  - 45. He responds quickly and accurately to external impressions.
  - 4. He is self-assertive; makes own decisions, without dependence on opinion of others.
  - 11. He tends to be inhibited and reserved in his dealings with other people.
  - 18. He is calm and composed, not tense.
  - 31. He learns quickly.
  - 46. He shows lack of initiative.
  - 47. He responds quickly and accurately to external impressions.
  - 64. Expansive ideation, or feelings or expressions of grandiosity are present.
  - 74. He copes adequately with anxiety arousing situations.
- \* Taken from Table 16, being the 13 items having the smallest magnitude of change.

were approximately equally distributed between plus, minus, and zero. These groups were then separately sorted, and arranged in order of decreasing consistency. Table 19 lists all the items which fell into the Most Improved group, the first one listed being the one found most consistent, and so on down. Table 20 lists, in order of decreasing consistency all the items which fell in the Most Impaired group. Those items which were relatively least changed are listed on Table 21.

Finally, when examining the list based on magnitude and the list based on consistency, we find that some items occur on both lists, either for improvement or for impairment. It is considered that these items are especially significant, since they are the ones which have changed most in terms of both magnitude and consistency. The overlapping items most improved are listed on Table 22; those most impaired are found on Table 23.



Table 19

Items Most Improved in Terms of Consistency  
(In Order of Decreasing Consistency)

---

75. He has feelings of guilt.
15. He has feelings of unreality about the world around him.
8. He is generally over-compliant in his interpersonal relationships.
54. The efficiency of his integrative ability remains adequate even under the impact of anxiety.
39. There is an autistic quality to his thinking, reflected in such things as fabrications, confabrications, neologisms, or contaminations.
66. He is a withdrawn, fantasy-ridden person.
25. He tends to organize his perceptions in an adequate (not arbitrary) manner.
22. He is unable to remember things which he had known for a long time.
24. He reaches the goals he sets for himself.
7. He is capable of admitting aggressive feelings; they are not likely to be pent-up.
36. He is capable of reflection and appropriate self-criticism.

Table 19 (con't)

Items Most Improved in Terms of Consistency  
(In Order of Decreasing Consistency)

---

57. Judgment is adequate: he recognizes the appropriate responses and acts on it without undue delay or unnecessary impulsivity.
69. Everything seems all right to him.
45. He responds quickly and accurately to external impressions.
49. He is capable of prolonged attention and deliberativeness.
6. He is without ambition or interest; i.e. he is satisfied with day to day living.
68. He feels lonely.
9. He is self-critical, and concerned over the adequacy of his performance.
70. He is deficient in planning capacity, enterprise.
65. He has feelings of worthlessness and despair.
35. He is unable to keep his mind to one purpose, changing directions easily, and permitting irrelevant ideas to enter.
52. He is preoccupied with ideas of sexual content.
62. His affect has depth, -it is not shallow.
43. He perceives his world in a vague, undifferentiated manner.

Table 19 (con't)  
Items Most Improved in Terms of Consistency  
(In Order of Decreasing Consistency)

---

27. He is capable of expressing ideas clearly and adequately.
44. He suffers from a persisting anxiety state of the dull, oppressive, free-floating, restless, vaguely uneasy variety.

Table 20

Items Most Impaired in Terms of Consistency  
(In Order of Decreasing Consistency)

---

- 73. He is tactful: He is not outspoken or overly candid.
- 55. He has no difficulty in shifting attitudes; (a flexibility of mental sets) e.g., to accept new elements into previously established groups.
- 48. A weakness of anticipations is apparent, so that foresight, or projecting into the future is impaired.
- 19. The effectiveness of his thinking and action is reduced by indecisiveness and/or doubting, and/or rumination.
- 72. He manifests inertia, or lack of drive.
- 26. His behavior is stereotyped and perseverated.
- 47. He maintains adequate control over affects.
- 2. He applies his assets constructively or creatively.
- 23. His aggression is likely to be absorbed in fantasy.
- 34. He is apathetic, does not have much feeling, desire or interest.
- 53. Emotional responses are free and flexible.
- 63. He is not disturbed by, or concerned with what ought to be problems to him.

Table 20

Items Most Impaired in Terms of Consistency  
(In Order of Decreasing Consistency)

---

41. His thinking reflects circumstantiality, i.e. he does not keep out statements or details which are unrelated to the central issue.
58. He tends to be perfectionistic and/or meticulous.

Table 21  
Items Least Changed in Terms of Consistency

4. He is self-assertive; makes own decisions, without dependence on opinions of others.
5. He directs his aggressions against himself.
46. He shows lack of initiative.
60. He has capacity for active, creative fantasy.
74. He copes adequately with anxiety-arousing situation.
18. He is calm and composed, not tense.
29. He is anxious, fearful, or uncertain about what the future will bring.
61. He has feelings of helplessness and inadequacy.
21. He has ideas of self-destruction.
16. Psychomotor and/or ideational retardation is evident.
13. His behavior is based on an abstract conceptual level of thinking.
56. His concentration is impaired.
51. Compulsive circumstantiality (of a paranoid nature) is seen.
40. Memory for recent events is impaired.
31. He learns quickly.
26. Critical restraint is not applied extensively enough, although there is no impairment of reality testing.
14. He is capable of learning adequately.
12. He is an ideationally active person.

Table 21 (con't)  
Items Least Changed in Terms of Consistency

- 64. Expansive ideation, or feelings or expressions of grandiosity are present.
- 37. In dealing with demands made on him he becomes over-alert and cautious.
- 30. Homoerotic impulses or conflicts are central.
- 3. There is warmth in his affect.
- 50. He is capable of coping with affects when they must be faced.
- 59. There is a tendency to "excitement" in mood; he reacts with strong feeling.
- 67. He is an inhibited person; his display of emotion is minimal.
- 1. He believes that his behavior and/or thinking are being influenced by outside forces. (Paranoid ideas of influence).
- 71. His affect and behavior are appropriate.
- 28. Feelings of aggressiveness and hostility interfere with interpersonal relationships.
- 42. His impulsive acts are likely to be aggressive.
- 76. He is irritable.
- 11. He tends to be inhibited and reserved in his dealings with other people.
- 17. He has a positive orientation in his relationships with other people; he is warm, sensitive, empathic.
- 32. In interpersonal relationships he is likely to become evasive or suspicious.

Table 21 (con't)  
Items Least Changed in Terms of Consistency

- 38. He is capable of grasping complex relationships, e.g., to organize and synthesize parts into a meaningful whole.
- 33. He tends to be self-centered, narcissistic in his thoughts and actions.
- 10. He likes and trusts other people.



Table 22  
Items Most Improved in Terms of Both Magnitude and  
Consistency

---

- 39. There is an autistic quality to his thinking, reflected in such things as fabrications, confabulations, neologisms, or contaminations.
- 38. He is generally over-compliant in his interpersonal relationships.
- 15. He has feelings of unreality about the world around him.
- 25. He tends to organize his perceptions in an adequate (not arbitrary) manner.
- 54. The efficiency of his integrative ability remains adequate even under the impact of anxiety.
- 75. He has feelings of guilt.

Table 23  
Items Most Impaired in Terms of Both Magnitude and  
Consistency

---

- 73. He is tactful; He is not outspoken or overly candid.
- 55. He has no difficulty in shifting attitudes; ( a flexibility of mental sets), e.g., to accept new elements into previously established groups.
- 48. A weakness of anticipations is apparent, so that foresight, or projecting into the future is impaired.
- 72. He manifests inertia, or lack of drive.
- 20. His behavior is stereotyped and perseverated.
- 23. His aggression is likely to be absorbed in fantasy.
- 53. Emotional responses are free and flexible.

## Chapter VIII

### DISCUSSION: Q-TECHNIQUE

#### 1. The Intercorrelations

The primary importance of the results of the intercorrelations lies in the positive demonstration that changes following lobotomy can be ascertained through the analysis of psychological tests. This change, furthermore, is also found to be statistically significant for most of the group.

Specifically, we find verification for the hypothesis that the patients become less alike after lobotomy than they had been before. To translate this into terms which shed light on the function of lobotomy, it would mean that the procedure apparently succeeds in disrupting the psychotic process, which had been the basis of commonality for these patients preoperatively. Thus, we may conclude that the lobotomy results in the diminution of the psychosis, hence in improvement.

The experiment with the "ideal" ratings suggests two points. First, that the original evaluations were most likely made mainly <sup>on</sup> the basis of the test data proper, without the likelihood that the raters might have been unduly influenced by extraneous or prejudicial factors. Though the group is a small one, and the differences not very considerable, it is nevertheless suggested by the fact that the ideal ratings

consistently correlated lower with the post-op test evaluations than with the pre-op ratings. This is reasonable: before the operation the patients are "ideal" candidates for lobotomy, -that is why they were selected. Since they were expected to change after the lobotomy, the observed differences between the original pre and the original post with the ideal ratings may be assumed to signify that the ratings were actually based on the test data. The "ideal" ratings serve also to support the earlier contentions that the patients change after lobotomy in the direction of less homogeneity. Since it may be assumed that it is the presence of psychotic factors which characterize an "ideal" candidate for lobotomy, the finding that the group is less like the ideal candidates after lobotomy means that the psychotic characteristics have also become less prominent.

The presence of HP (the patient with intractable pain) in our group provides some interesting observations. First, the fact that his pre-op condition is definitely unlike that of the rest of the group, - the psychotic patients, - provides added support for the relative homogeneity of the pre-operative group. Second, the significantly greater similarity of his post-operative mean with the means of the psychotic group adds to the evidence that the post-op group are more heterogeneous, and that the psychotic factors are relatively diminished.

## 2. Item- Analysis

One of the questions raised earlier was in regard to the direction of the change that occurs after lobotomy. While some suggestions already appeared, in the analysis of the intercorrelations, that the psychosis is diminished, we find here additional evidence that improvement occurs among the psychotic patients. That the improvement is only relative, and that the operation also contributes negative factors to the personality, is suggested at this stage by the sums of weighted values. The fact that HP is the only one whose change results in a greater sum of minus, emphasizes the latter point. While these changes are relatively small, especially in a few of the cases, it is noteworthy that, in contrast to HP, the net result of lobotomy for patients who manifested psychopathology before the operation is in the relative improvement in their personality. Some significance may also be added by the consistency with which the change in this direction occurs.

The specific changes are highlighted by the various item-analyses which are presented. In these we find three kind of data. We isolate those items which seemed most improved; those which are most impaired; and those which apparently do not change. It should be remembered that the changes that occur are dependent on the kind of person we

found before the operation. These changes, -and items, - are also relative to each other, inasmuch as the judgments had to be made by each rater in terms of the relative saliency of each characteristic within the context of the total personality picture, to the extent that it is represented by the 76 statements in the trait-universe. However, it is precisely this dynamic relativism which makes the ratings more meaningful, than, for example, a traditional rating scale, in which the rating and calculations of individual items are generally made on an absolute and independent basis, so that the relative significance of the various items is not apparent. Now, since all of the items in the trait-universe are based on claims made in the literature in regard to lobotomy changes, we can consider them in the form of hypotheses which were here tested. Thus, those items appearing on the "most improved" lists may be considered verification for claims that these characteristics are modified by lobotomy in the direction of improvement; those items on the "most impaired" lists verify the claims for the negative consequences of lobotomy; and those items on the equivocal lists find no support, in this study, for change in either one direction or the other. It is true, of course, that these results hold only insofar as they occur within the context of this trait-universe; but, though some

arbitrariness in their selection was inevitable, every effort was made to construct this trait-universe so as to be maximally representative of the opinions expressed in the published literature.

When the various lists are translated into composite patterns, we find the following pictures:

Most improved in terms of magnitude: (Table 13).

Psychotic characteristics are most prominently reduced, as seen in the diminution in autistic thinking and other forms of thought disorder, and in his capacity to organize his perceptions more adequately (less arbitrarily), and in reduction in the feelings of unreality. Depressive manifestations are diminished, as represented by the reduction of feelings of guilt, worthlessness and despair. Anxieties and tensions are markedly reduced, since he is capable of more prolonged attention, the efficiency of his integrative ability under the impact of anxiety remains more adequate, everything seems alright to him, and he does not suffer as much from generalized and free-floating anxieties. Intellectual functioning also seems on a somewhat better, more efficient level, especially as reflected in his improved capacity to express ideas more clearly and adequately.

Most improved in terms of consistency: (Table 19).

(Based on the first eleven items)

The reduction of psychotic manifestations is seen in the diminution of the feelings of unreality about the world, the reduction of autistic thinking, the improved adequacy of perceptual organization, and in the fact that he is not as withdrawn and fantasy-ridden as he had been. Intellectual functions see improvement, since memory is improved, he is better capable of reflection and appropriate self-criticism, his integrative ability remains more efficient, even under the impact of anxiety, and he is more capable of reaching the goals he sets for himself. He no longer suffers as much from feelings of guilt, he is more capable of admitting aggressive feelings, so that they are not likely to remain pent-up, and he is not as dependent and over-compliant in his inter-personal relationships.

Most impaired in terms of magnitude: (Table 14).

Some intellectual deficiencies are manifested in the form of more stereotypy and perseveration in his behavior, more difficulty in shifting attitudes (rigidity of mental sets), weakening of anticipation and foresight, more inertia and less drive, and increased psychomotor and/or ideational retardation. Especially marked is the change in his inter-personal relationships. He is much more tactless, being too outspoken and overly candid, and is likely to give much easier vent to his aggressions. There is less warmth in his affect,

he does not like and trust people as much, and he tends to be much more self-centered and narcissistic in his thoughts and actions.

Most impaired in terms of consistency: (Table 20).

Intellectual impairment is especially prominent, and is manifested by the following observations. He has greater difficulty in shifting attitudes (rigidity of mental sets), there is more weakness of anticipation and foresight, the effectiveness of his thinking and action is reduced by virtue of indecisiveness and rumination, his behavior is more stereotyped and perseverated, he manifests more inertia and lack of drive, and he does not apply his assets as constructively. Especially noticeable is his tactlessness, and his affect is marked by apathy, rigidity and relatively inadequate control.

The items appearing on the various "equivocal" lists, i.e., those items which changed relatively little on the different item-analysis manipulations, are self-explanatory, as they stand, since it would not have any meaning to make a "composite" of them as had been done for the others. The significance of these items may be considered primarily in the light of the hypotheses in the literature, and our conclusion would be that lobotomy affects these personality factors less than it does others. This, of course, applies only to the group as a whole, since it is entirely possible that



one or two or more individuals do have considerable changes on that item. The "equivocal" items, then, especially those which are not found on both the lists of least change, (for magnitude and for consistency), may be representative of the individual differences operating. Indeed, this factor of individual differences may very well be the explanation for the small differences that had to be dealt with in the item analyses. At the same time, however, those trends and consistencies which were found may be thought of as those which rise above the individual differences, and are therefore representative of some of the constant factors associated with lobotomy.

A question arises in regard to HP and the apparently contradictory findings between the results of the Q-technique and the analyses of the scores. In the former it was seen and concluded that HP is consistently different from the rest of the group, and that his change after lobotomy is in the direction of impairment. But when we examine his scores on the various tests it is seen that the change appears to be definitely in the direction of "improvement", insofar as increased scores reflect improvement. Thus, his total IQ goes up 15 points, and his Verbal IQ goes up 20 points, increases greater than those found in any other patient. Examination of the individual subtests, however, reveals that this "improvement"

needs to be qualified. It is true that increases in score are seen on some subtests, but these occur mainly on those which were unduly depressed before the operation, as, for example, on Similarities and Comprehension (increases of 49 and 45). Actually, some of the inter-test deviation are found to be negative, and even in those where the I.D. is positive, the vocabulary deviation is still negative, though it may be less so than was true before. This further suggests that there was an unusual drop in some of the scores before the operation, possibly associated with the intense pain the patient was experiencing. After the operation, though there was improvement in these excessively lowered scores, others remain low (below the V.D.), or even suffer some losses.

Similarly, despite the fact that the Sorting Test finds an increase for HP in the number of OD responses and other "improved" scores, it is seen that on the Proverbs HP is one of those whose responses are definitely more concretistic after lobotomy.

Returning now to the item-analysis on the Q-technique, it is seen that there are a greater number of "negative" items in HP's post-op rating than was present in pre-op, suggesting greater "impairment" following lobotomy. It may be of interest to look into the specific areas of change which occurred for HP. Below are listed those items which changed 3 or more

units. In the parentheses, the first number is the actual pre-op rating for that item, the second number the actual post-op rating. The higher the number, the greater the saliency.

4. (5-2) He is self assertive; makes own decisions, without dependence on opinions of others.

8. (2-7) He is generally over compliant in his interpersonal relationships.

17. (5-2) He has a positive orientation in his relationships with other people; he is warm, sensitive, empathic.

27. (1-4) He is capable of expressing ideas clearly and adequately.

34. (3-6) He is apathetic, does not have much feeling, desire or interest.

44. (4-7) He suffers from a persisting anxiety state of the dull, oppressive, free-floating, restless, vaguely uneasy variety.

48. (8-4) A weakness of anticipations is apparent, so that foresight, or projecting into the future is impaired.

67. (4-7) He is an inhibited person; his display of emotion is minimal.

70. (7-4) He is deficient in planning capacity, enterprise.

Some indications of improvement are seen here: Insofar as, before the operation, his difficulties with planning ability, anticipations, and expressing ideas clearly were prominent, they have now lost their prominence in his personality make-up. On the other hand, features which had not been especially salient before, are now found more essential. Thus, he seems to have become much more dependent and helpless, more inhibited, and more apathetic. Affect seems to be dulled, inasmuch as he

is less warm, sensitive, and empathic, and his display of emotion is minimal. For some reason, he is also seen as more anxious and uneasy.

## CHAPTER IX SUMMARY AND CONCLUSIONS

In terms of the major questions posed in this study, it was seen that changes in personality following lobotomy are reflected through the evaluation of psychological tests. These changes, furthermore, were seen to be in the general direction of "improvement", and the specific nature of these changes was ascertained by means of the item analyses. However, although the "net" changes were in the direction of improvement, other consequences of lobotomy were also found which would come under the heading of "impairment". It is concluded that though improvements are found, there can be little doubt that the residues of psychosis are still present in the post-lobotomy picture. Whether the changes that occur are to be attributed to lobotomy, or to organic brain damage, or to the special attention and psychotherapy which these patients have received, could not be ascertained, but it is noteworthy that these patients had all had various treatments in the long course of their illness before the operation, without improvement. At any rate, it is significant to know that, regardless of the exact explanation for the change, they were different after the lobotomy as compared with the way they were seen before the lobotomy.

The use of the Q-technique was introduced as a new method for application in clinical research, and considered to be a valuable one, since it permits the clinician to use the battery of tests in a global, unified manner, just as

he does in his everyday practice with these tests. Though the personality variables are limited to the 76 items included in the trait-universe, the rater was able to think of these characteristics of the patient in terms of a dynamic, relativistic pattern, with some features assuming greater significance and prominence in the total picture than do others. At the same time, a degree of quantification and "objectification" was approached via the rating scale and the correlations, as well as obtaining some measurement and evaluation of common trends. A further advantage was available in this group of raters, in view of their common approach to the tests and their common understanding of the terms. At the same time, this situation introduced an extraneous factor in the form of the raters' gross familiarity with the nature of the research project.

It was also seen that the test scores did make some contribution and did show some trends, although many of these were not consistent. Where inconsistencies between the "sign" results and the Q-technique results occur, these may be understood in the same way that a similar occurrence in clinical practice would be understood. The "signs" are thought of as just that, - sign-posts, - pointing in a general direction, which, on further investigation may prove to be a straight road or a devious one. Thus, the clinician does not ignore the signs; on the contrary, he finds them of considerable value in the initial orientation to the test data, and in the delineation of the issues. Their meaning

may become considerable modified, or elaborated, in the course of the detailed analysis of the tests, when the more complex details and nuances are recognized. It is presumed that, in the Q ratings, the raters did utilize the signs, or scores, in just this way, and the final ratings are based on the combined evaluation of all the data.

The presence of HP, the patient with intractable pain, as one of the group, afforded the opportunity for a kind of control, since his ratings served the purpose of comparison with the psychotics of the group. It was also of interest that, in contrast with psychotics who had a "net" improvement, HP had a "net impairment" after the lobotomy. This supports the assumption that the improvement that is seen after the lobotomy represents the improvement in the psychosis, but that lobotomy also imposes changes of a negative nature.

While the item-analyses pointed up some trends, it was evident that the changes are relatively small and not too consistent. Part of this may be due to the small size of the group, and part may also be a representation of the individual differences of the various patients. Thus, we can consider two classes of factors: one, those more or less common to the total group, which may be thought of as the "lobotomy factors"; and, two, those which remain inconsistent or minimally changed, as the individual differences factors, dependent on the nature

of the basic personality structure. Similarly, examination of some of the individual  $r$ 's reveals figures which are hard to understand, and have also to be attributed to individual differences, though they may possibly be clarified and better understood by the detailed study of the individual cases.

Attention was focussed on a "learning" factor which may have been influencing the test results. This applies not only to the analysis of the test scores, but may be applicable to the details of the qualitative data. It is necessary, furthermore, to recognize not only relatively specific and isolated learning factors, such as, for example, learning, - and remembering, - how to put together the pieces on the Object Assembly subtest; but also the effect of experience and familiarity with the tests and being tested, an important factor not present at the time of the first tests. Also, more complex learning, which is not dependent on specific memories may also be operating. This may have been the case on the Sorting Test, where consistent increases in conceptual definitions are seen post-operatively. What might have been present on re-test is the "concept of a concept", which was not available when the experience was completely new.

It becomes evident that many of the questions that have been raised, and others, might be resolved by the introduction of controls in a study like the present one. Two purposes would be served: one, control with matched



non-lobotomized patients who are receiving the same post-operative care, (such as was carried out by the Columbia-Greystone Topectomy project), to evaluate the factor of lobotomy; and, second, with a matched group of patients who are retested at identical intervals, to study the effects of the learning factor. Light on the influence of learning could also be shed by carefully following up changes which occur in a series of repeated tests on one patient. It is also apparent that the factor of reliability could be ascertained by comparing the evaluations of different raters on the same battery of tests. Similarly, the meaningfulness and clarity of much of the data could be increased by increasing the size of the group.

Finally, though many of the findings are tenuous, and many of the conclusions conjectural, it is believed that this study has highlighted some of the consequences of lobotomy, and has clarified some of the important issues in clinical research.

Chapter X  
A P P E N D I X

1. He believes that his behavior and/or thinking are being influenced by outside forces. (Paranoid ideas of influence). (-)
2. He applies his assets constructively or creatively. (✓)
3. There is warmth in his affect. (✓)
4. He is self-assertive; makes his own decisions, without dependence on opinions of others. (✓)
5. He directs his aggressions against himself. (-)
6. He is without ambition or interest; i.e., he is satisfied with day to day living. (-)
7. He is capable of admitting aggressive feelings; they are not likely to be pent-up. (✓)
8. He is generally over-compliant in his interpersonal relationships. (-)
9. He is self-critical, and concerned over the adequacy of his performance. (-)
10. He likes and trusts other people. (✓)
11. He tends to be inhibited and reserved in his dealings with other people. (-)
12. He is an ideationally active person. (✓)
13. His behavior is based on an abstract conceptual level of thinking. (✓)
14. He is capable of learning adequately. (✓)
15. He has feelings of unreality about the world around him. (-)
16. Psychomotor and/or ideational retardation is evident. (-)
17. He has a positive orientation in his relationships with other people; he is warm, sensitive, empathic. (✓)
18. He is calm and composed, not tense. (✓)
19. The effectiveness of his thinking and action is reduced by indecisiveness and/or doubting, and/or rumination. (-)

20. His behavior is stereotyped and perserverated. (-)
21. He has ideas of self-destruction. (-)
22. He is unable to remember things which he had known for a long time. (-)
23. His aggression is likely to be absorbed in fantasy. (✓)
24. He reaches the goals he sets for himself. (✓)
25. He tends to organize his perceptions in an adequate (not arbitrary) manner. (✓)
26. Critical restraint is not applied extensively enough, although there is no impairment of reality testing. (-)
27. He is capable of expressing ideas clearly and adequately. (✓)
28. Feelings of aggressiveness and hostility interfere with interpersonal relationships. (-)
29. He is anxious, fearful, or uncertain about what the future will bring. (-)
30. Homoerotic impulses or conflicts are central. (-)
31. He learns quickly. (✓)
32. In interpersonal relationships he is likely to become evasive or suspicious. (-)
33. He tends to be self-centered, narcissistic in his thoughts and actions (-)
34. He is apathetic, does not have much feeling, desire or interest. (-)
35. He is unable to keep his mind to one purpose, changing directions easily, and permitting irrelevant ideas to enter. (-)
36. He is capable of reflection and appropriate self-criticism. (✓)
37. In dealing with demands made on him he becomes overalert and cautious. (-)

38. He is capable of grasping complex relationships, e.g., to organize and synthesize parts into a meaningful whole. (✓)
39. There is an autistic quality to his thinking, reflected in such things as fabulations, confabulations, neologisms, or contaminations. (-)
40. Memory for recent events is impaired. (-)
41. His thinking reflects circumstantiality, i.e., he does not keep out statements or details which are unrelated to the central issue. (-)
42. His impulsive acts are likely to be aggressive. (-)
43. He perceives his world in a vague, undifferentiated manner. (-)
44. He suffers from a persisting anxiety state of the dull, oppressive, free-floating, restless, vaguely uneasy variety. (-)
45. He responds quickly and accurately to external impressions. (✓)
46. He shows lack of initiative. (-)
47. He maintains adequate control over affects. (✓)
48. A weakness of anticipations is apparent, so that foresight, or projecting into the future is impaired. (-)
49. He is capable of prolonged attention and deliberativeness. (✓)
50. He is capable of coping with affects when they must be faced. (✓)
51. Compulsive circumstantiality (of a paranoid nature) is seen. (-)
52. He is preoccupied with ideas of sexual content. (-)
53. Emotional responses are free and flexible. (✓)
54. The efficiency of his integrative ability remains adequate even under the impact of anxiety. (✓)

55. He has no difficulty in shifting attitudes; (a flexibility of mental sets), e.g., to accept new elements into previously established groups. (✓)
56. His concentration is impaired. (-)
57. Judgment is adequate; he recognizes the appropriate responses and acts on it without undue delay or unnecessary impulsivity. (✓)
58. He tends to be perfectionistic and/or meticulous. (-)
59. There is a tendency to "excitement" in mood; he reacts with strong feeling. (-)
60. He has capacity for active, creative fantasy. (✓)
61. He has feelings of helplessness and inadequacy. (-)
62. His affect has depth, - it is not shallow. (✓)
63. He is not disturbed by, or concerned with what ought to be problems to him. (-)
64. Expansive ideation, or feelings or expressions of grandiosity are present. (-)
65. He has feelings of worthlessness and despair. (-)
66. He is a withdrawn, fantasy-ridden person. (-)
67. He is an inhibited person; his display of emotion is minimal. (-)
68. He feels lonely. (-)
69. Everything seems all right to him. (✓)
70. He is deficient in planning capacity, enterprise. (-)
71. His affect and behavior are appropriate. (✓)
72. He manifests inertia, or lack of drive. (-)
73. He is tactful: He is not outspoken or overly candid. (✓)
74. He copes adequately with anxiety-arousing situations. (✓)

75. He has feelings of guilt. (-)

76. He is irritable. (-)

Table B  
Wechsler-Bellevue Raw Scores  
Total I. Q.

<u>PATIENT</u>	<u>PRE</u> <u>SCORE</u>	<u>POST</u> <u>SCORE</u>	<u>I. D.</u>
H. P.	99	114	/ 15
B. C.	110	111	/ 1
E. Z.	107	110	/ 3
R. M.	121	122	/ 1
K. H.	87	89	/ 2
J. D.	102	109	/ 7
T. B.	102	103	/ 1
L. Z.	127	129	/ 2
M. M.	100	110	/ 10

Verbal I. Q.

H. P.	96	116	/ 20
B. C.	122	115	- 7
E. Z.	108	107	- 1
R. M.	115	117	/ 2
K. H.	90	94	/ 4
J. D.	104	106	/ 2
T. B.	95	100	/ 5
L. Z.	117	122	/ 5
M. M.	105	122	/ 7



Performance I. Q.

<u>PATIENT</u>	<u>PRE</u> <u>SCORE</u>	<u>POST</u> <u>SCORE</u>	<u>I. D.</u>
H. P.	102	109	/ 7
B. C.	96	106	/ 10
E. Z.	104	111	/ 7
R. M.	125	123	- 2
K. H.	84	83	- 1
J. D.	96	107	/ 11
T. B.	109	105	- 4
L. Z.	133	130	- 3
M. M.	94	106	/ 12

Vocabulary

H. P.	11	13	/ 2
B. C.	14	11	- 3
E. Z.	12	11	- 1
R. M.	12	12	0
K. H.	9	9	0
J. D.	13	13	0
T. B.	8	9	/ 1
L. Z.	12	12	0
M. M.	10	11	/ 1

Comprehension

<u>PATIENT</u>	<u>PRE</u>		<u>POST</u>		<u>I. D.</u>
	<u>SCORE</u>	<u>V. D.</u>	<u>SCORE</u>	<u>V. D.</u>	
H. P.	6	- 5	11	- 2	/ 5
B. C.	10	- 4	11	0	/ 1
E. Z.	12	0	13	/ 2	/ 1
R. M.	11	- 1	9	- 3	- 2
K. H.	8	- 1	7	- 2	- 1
J. D.	7	- 6	7	- 6	0
T. B.	6	- 2	7	- 2	/ 1
L. Z.	10	- 2	14	/ 2	/ 4
M. M.	11	/ 1	13	/ 2	/ 2

Information

H. P.	11	0	12	- 1	/ 1
B. C.	12	- 2	11	0	- 1
E. Z.	11	- 1	11	0	0
R. M.	11	- 1	11	- 1	0
K. H.	6	- 3	8	- 1	/ 2
J. D.	10	- 3	10	- 3	0
T. B.	9	/ 1	9	0	0
L. Z.	13	/ 1	14	/ 2	/ 1
M. M.	11	/ 1	12	/ 1	/ 1

Digit Span

<u>PATIENT</u>	<u>PRE</u>		<u>POST</u>		<u>I. D.</u>
	<u>SCORE</u>	<u>V. D.</u>	<u>SCORE</u>	<u>V. D.</u>	
H. P.	9	- 2	7	- 6	- 2
B. C.	6	- 8	7	- 4	/ 1
E. Z.	9	- 3	10	- 1	/ 1
R. M.	7	- 5	7	- 5	0
K. H.	7	- 2	9	0	/ 2
J. D.	7	- 6	4	- 9	- 3
T. B.	6	- 2	4	- 5	- 2
L. Z.	7	- 5	7	- 5	0
M. M.	13	/ 3	14	/ 3	/ 1

Arithmetic

H. P.	7	- 4	9	- 4	/ 2
B. C.	12	- 2	10	- 1	- 2
E. Z.	7	- 5	6	- 5	- 1
R. M.	15	/ 3	15	/ 3	0
K. H.	9	0	8	- 1	- 1
J. D.	12	- 1	12	- 1	0
T. B.	7	- 1	9	0	/ 2
L. Z.	12	0	10	- 2	- 2
M. M.	10	0	10	- 1	0

Similarities

<u>PATIENT</u>	<u>PRE</u>		<u>POST</u>		<u>I. D.</u>
	<u>SCORE</u>	<u>V. D.</u>	<u>SCORE</u>	<u>V. D.</u>	
H. P.	3	- 8	12	- 1	/ 9
B. C.	15	/ 1	13	/ 2	- 2
E. Z.	11	- 1	11	0	0
R. M.	7	- 5	11	- 1	/ 4
K. H.	5	- 4	8	- 1	/ 3
J. D.	8	- 5	10	- 3	/ 2
T. B.	7	- 1	8	- 1	/ 1
L. Z.	11	- 1	13	/ 1	/ 2
M. M.	9	- 1	11	0	/ 2

Picture Arrangement

H. P.	6	- 5	9	- 4	/ 3
B. C.	4	-10	6	- 5	/ 2
E. Z.	7	- 5	10	- 1	/ 3
R. M.	5	- 7	8	- 4	/ 3
K. H.	6	- 3	3	- 6	- 3
J. D.	10	- 3	11	- 2	/ 1
T. B.	11	/ 3	8	- 1	- 3
L. Z.	11	- 1	11	- 1	0
M. M.	6	- 4	11	0	/ 5

Picture Completion

<u>PATIENT</u>	<u>PRE</u>		<u>POST</u>		<u>I. D.</u>
	<u>SCORE</u>	<u>V. D.</u>	<u>SCORE</u>	<u>V. D.</u>	
H. P.	8	- 3	8	- 5	0
B. C.	7	- 7	6	- 5	- 1
E. Z.	9	- 3	8	- 3	- 1
R. M.	14	/ 2	13	/ 1	- 1
K. H.	6	- 3	7	- 2	/ 1
J. D.	8	- 5	11	- 2	/ 3
T. B.	6	- 2	7	- 2	/ 1
L. Z.	14	/ 2	13	/ 1	- 1
M. M.	7	- 3	9	- 2	/ 2

Block Design

H. P.	8	- 3	7	- 6	- 1
B. C.	6	- 8	7	- 4	/ 1
E. Z.	10	- 2	12	/ 1	/ 2
R. M.	12	0	12	0	0
K. H.	4	- 5	5	- 4	/ 1
J. D.	12	- 1	14	/ 1	/ 2
T. B.	9	/ 1	10	/ 1	/ 1
L. Z.	15	/ 3	16	/ 4	/ 1
M. M.	9	- 1	12	/ 1	/ 3

Object Assembly

<u>PATIENT</u>	<u>PRE</u>		<u>POST</u>		<u>I. D.</u>
	<u>SCORE</u>	<u>V. D.</u>	<u>SCORE</u>	<u>V. D.</u>	
H. P.	10	- 1	12	- 1	/ 2
B. C.	5	- 9	11	0	/ 6
E. Z.	10	- 2	12	/ 1	/ 2
R. M.	12	0	12	- 1	- 1
K. H.	7	- 2	8	- 1	/ 1
J. D.	12	- 1	13	0	/ 1
T. B.	12	/ 4	10	/ 1	- 2
L. Z.	14	/ 2	14	/ 2	0
M. M.	12	/ 2	10	- 1	- 2

Digit Symbol

H. P.	6	- 5	8	- 5	/ 2
B. C.	10	- 4	10	/ 1	0
E. Z.	13	- 1	12	/ 1	- 1
R. M.	10	- 2	10	- 2	0
K. H.	7	- 2	6	- 3	- 1
J. D.	6	- 7	7	- 6	/ 1
T. B.	6	- 2	5	- 4	- 1
L. Z.	11	- 1	9	- 3	- 2
M. M.	7	- 3	8	- 3	/ 1

Table C  
LIST OF PROVERBS

- A.
1. Don't count your chickens before they're hatched.
  2. No use crying over spilt milk.
  3. A barking dog never bites.
  4. The wheel that does the squeaking is the wheel that gets the grease.
  5. Who pays the piper, calls the tune.
  6. As the twig is bent, so is the tree inclined.
  7. You catch more flies with honey than with vinegar.
  8. The restless sleeper blames the couch.
  9. The tongue is the enemy of the neck.
  10. A golden hammer breaks an iron door.
- B.
1. All is not gold that glitters.
  2. Don't cross the bridge before you come to it.
  3. Too many cooks spoil the broth.
  4. Straws show which way the wind blows.
  5. A stitch in time saves nine.
  6. Still waters run deep.
  7. It's an ill wind that blows nobody good.
  8. Wild colts make good horses.
  9. The hot coal burns -- the cold one blackens.
  10. Make yourself honey and the flies will eat you.
- C.
1. One swallow doesn't make a summer.
  2. The grass is always greener in the other fellow's yard.
  3. It's a dirty bird that fouls its own nest.
  4. A rolling stone gathers no moss.
  5. Don't try to carry water cans on both shoulders.
  6. Water falling day by day wears the hardest stone away.
  7. He who rides the tiger cannot dismount.
  8. Don't pry a stone with a sword.
  9. Lie down with the dogs, get up with the fleas.
  10. The mouse that has but one hole is soon caught.

Table D  
Rorschach Scores

On the following pages are tabulated the Rorschach scores for all the patients. Under column A (and in Row A) are given all the pre-operative scores. Under B, the post-operative scores. C represents the change, or difference, between the two.

Note in connection with the pre-op (A) Rorschach of patient JD: When this test was administered, the patient responded on each card only that "it looks like ink - ink spilled on cardboard or paper". After failing each card, the cards were re-presented, this time with specific suggestions for percepts to be recognized, at the suggestion of the examiner. Most of the subsequent responses were first "suggested", then recognized by the patient, who also pointed out the location.



Table D  
Rorschach Scores

	<u>R</u>			<u>F%</u>			<u>F new %</u>			<u>Fc%</u>			<u>F+ new %</u>			<u>W%</u>			<u>D%</u>			<u>Dr%</u>		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
H P	A	8		50			88			75			71			100			0			0		
	B		12		67			100		100			100			25			75			0		
	C			+4		+17			+12			+25			+29			-75			+75			0
B C	A	14		57			71			75			83			43			57			0		
	B		8		50			100		50			63			88			13			0		
	C			-6		-5			+29			-25			-20			+45			-44			0
B Z	A	19		68			95			42			61			42			42			16		
	B		17		65			80		54			63			50			40			10		
	C			-2		-3			-5			+12			+2			+8			-2			-6
R M	A	12		58			100			71			67			33			50			17		
	B		16		56			94		78			87			31			44			19		
	C			+4		-2			-6			+7			+20			-2			-6			+2
K H	A	27		41			74			36			35			59			41			0		
	B		21		38			71		50			40			62			33			5		
	C			-6		-3			-3			+14			+5			+3			-8			+5
J D	A	0		62			83			55			50			15			64			13		
	B		20		80			90		38			33			55			40			0		
	C			+20		+18			+17			-17			-17			+40			-20			-13
T B	A	18		78			89			79			81			33			56			11		
	B		18		56			72		40			38			44			44			12		
	C			0		-22			-17			-39			-43			-11			-12			+1
L Z	A	45		78			89			60			60			18			60			13		
	B		38		55			92		67			71			1			61			0		
	C			-7		-23			+3			+7			+11			-17			+1			-13
M M	A	17		84			95			38			39			47			53			0		
	B		15		73			80		36			33			27			53			20		
	C			-2		-11			-15			-2			-6			-20			0			+20

Table D  
Rorschach Scores

		WS-DS-S <sub>2</sub>			Fail			R.T.			C.R.T.			Sum C			M. FM			FC			CF		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
H P	A	13			2			43			61			1.5			2			1			1		
	B		0			4		17			14			1.5		1			3				0		
	C			-13			+2			-34			-47		0				-1			+2			-1
B C	A	-			1			32			36			3.5		0			-			2			
	B		-			2		6			6			0			1			-			0		
	C			-			+1			-26			-30			-5.5			+1			-			-2
E Z	A	5			0			29			23			2			-			1			0		
	B		0			1		23			36			3			-			0			3		
	C			-5			+1			-6			+13			+1.0			-			-1			+3
R M	A	-			4			31			64			5			1			1			-		
	B		-			1		59			63			1.5			1			0			-		
	C			-			-3			+28			-1			+1.0			0			-1			-
K H	A	4			-			9			7			8.5			-			0			5		
	B		0			-		19			23			2.5			-			2			1		
	C			-4			-			+10			+16			-6.0			-			-2			-4
J D	A	4			0									10.5			3.5			3			3		
	B		20			1		13			14			2			0			0			2		
	C			+16			-1									8.5			-3.5			-3			-1
T B	A	6			1			27			10			2.5			0.5			-			1		
	B		0			0		40			55			5.0			2			-			5		
	C			-6			-1			+13			+45			+2.5			+1.5			-			+4
L Z	A	3			-			21			16			4.5			2			0			3		
	B		5			-		28			16			3.5			6			1			3		
	C			+2			-			+7			0			-1.0			+4			+1			0
M M	A	29			1			36			35			0			1			-			0		
	B		0			0		61			48			3			1			-			3		
	C			-29			-1			+25			+13			+3			0			-			-3

Table D  
Rorschach Scores

		C			FC			F Ch			A%			Obj. %			P%			At%			P%		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
H P	A	-			-			-			50			0			50			-			25		
	B		-			-			-		57			8			33			-			8		
	C			-			-			-			+17			+8			-17			-			-17
B C	A	-			-			1			57			14			36			-			21		
	B		-					2			68			0			50			-			13		
	C			-			-			+1			+31			-14			+14			-			-8
E Z	A	1			1			2			53			5			21			32			0		
	B		0			0		2			50			20			25			10			5		
	C			-1			-1			0			-3			+15			+4			-22			15
R M	A	0			3			0			25			-			17			42			33		
	B		1			1		1			44			-			25			4			44		
	C			+1			+1			+1			+19			-			+8			-38			+11
K H	A	2			6			0			37			0			11			37			-		
	B		0			0		2			38			14			24			14			-		
	C			-2			-2			+2			+1			+14			+13			-23			-
J D	A	3			4			0			51			23			17			-			17		
	B		0			0		1			55			5			25			-			5		
	C			-3			-3			+1			+4			-18			+8			-			-12
T B	A	1			1			-			61			6			11			0			0		
	B		0			0			-		44			0			22			11			11		
	C			-1			-1			-			-17			-6			+11			+11			+4
L Z	A	-			1			1			31			-			13			9			36		
	B		-					7			47			-			11			13			29		
	C			-			-			+6			+16			-			-2			+4			-7
M M	A	-						1			21			6			16			12			5		
	B		-					0			13			7			20			0			27		
	C			-				-1					-8			+1			+4			-12			+22

Table D  
Rorschach Scores

		<u>Sex</u>			<u>Plant</u>			<u>Blood</u>			<u>Comb.</u>			<u>Fab</u>			<u>Fab-Comb</u>			<u>Mast-Cast.</u>			<u>C. Naming etc.</u>		
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
H P	A	-			25			-			-			-			-			-			-		
	B		-		17			-			-			-			-			-			-		
	C			-		-8		-			-			-			-			-			-		
B. C	A	-			-			-			3			1			-			-			1		
	B		-		-			-			0			0			-			-			1		
	C			-		-		-			-3			-1			-			-			0		
E Z	A	2			-			-			1			-			0			3			0		
	B		1		-			-			1			-			2			6			1		
	C			-1		-		-			0			-			+2			+3			-1		
R M	A	-			-			0			-			-			-			-			0		
	B		-		-			1			-			-			-			-			3		
	C			-		-		+1			-			-			-			-			+3		
K H	A	-			4			1			3			4			-			-			2		
	B		-		0			0			2			0			-			-			5		
	C			-		-4		-1			-1			-4			-			-			+3		
J D	A	-			2			1			3			-			-			-			0		
	B		-		0			0			0			-			-			-			2		
	C			-		-2		-1			-3			-			-			-			+2		
T B	A	-			17			2			2			-			0			0			3		
	B		-		17			1			1			-			1			1			1		
	C			-		0		-1			-1			-			+1			+1			-2		
L Z	A	8			-			1			2			7			0			-			-		
	B		2		-			2			0			5			1			-			-		
	C			-6		-		+1			-2			-2			+1			-			-		
M M	A	6			6			1			1			1			0			1			0		
	B		4		20			0			1			0			1			0			2		
	C			-2		-14		-1			0			-1			+1			-1			+2		

**TABLE E**  
**Intercorrelations of Ideal With Original Ratings, With Comparison of Same Raters' Original R's**

	BTB		BLZ		BJD		BHC		ABC		ALZ		AEZ		ARM		MEAN	
	Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig	
ABP	11	22	15	23	19	22	06	32	17	33	06	02	03	21	10	42	11	25
BHP	27	17	33	22	34	29	26	47	31	63	22	36	26	53	10	59	26	41
ABC	50	48	53	50	26	47	54	50	51	-	31	38	53	46	51	53	46	47
BBC	54	49	53	42	31	50	49	-	51	50	24	44	47	52	33	65	43	50
AEZ	59	43	60	45	54	48	57	52	50	46	43	58	38	-	39	54	50	49
BEZ	36	42	51	40	26	29	33	54	37	54	25	37	30	39	36	38	34	42
ARM	42	45	40	33	33	31	42	65	37	53	28	47	37	54	26	-	36	48
BRM	17	16	28	05	16	28	11	34	26	50	17	08	21	41	19	44	19	28
AKH	49	45	46	36	38	41	36	71	42	44	21	40	47	51	35	62	39	49
BKH	42	33	48	38	27	37	40	36	44	52	20	42	22	51	36	30	36	40
AJD	66	61	66	39	19	64	60	42	58	56	24	46	36	52	54	25	48	48
BJD	61	59	63	32	28	-	55	50	55	47	30	30	34	48	42	31	46	42

	BTB		BLZ		BJD		BBC		ABC		ALZ		AEZ		ARM		MEAN	
	Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig		Ideal Orig	
ATB	58	61	62	40	36	58	56	46	43	42	28	54	17	61	54	46	46	51
BTB	59	-	66	39	28	59	60	49	57	48	20	36	45	43	58	45	49	46
ALZ	39	36	48	63	40	30	58	44	34	38	39	-	44	58	39	47	43	45
BLZ	36	39	58	-	61	32	63	42	32	50	46	63	56	45	59	33	53	43
AMM	51	49	60	54	37	44	48	58	42	40	29	57	44	49	35	45	43	50
BMM	31	36	30	26	-07	35	28	20	33	46	13	15	12	19	29	28	21	28
Mean Pre	47	46	50	43	34	43	46	51	43	44	28	43	35	39	28	47	40	46
Mean Post	40	36	48	31	27	37	41	42	41	49	24	35	32	43	36	41	36	40
Mean Pre (Without) HP	52	49	54	43	35	45	51	54	46	46	30	49	40	53	42	47	44	48
Mean Post (Without) HP	42	39	50	32	26	39	42	41	42	50	24	37	33	42	41	40	38	40

NOTE: The letters at the top refer to the raters of the ideal. The "ideal" columns refer to the correlations of the ideal with the original. The "original" columns refer to the correlations obtained between those two raters in the original experiment.

Table F

## Inter-Rating Differences for Each Item

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	(-)	(+)	(+)	(+)	(-)	(-)	(+)	(-)	(-)	(+)	(-)	(+)	(+)	(+)	(-)	(-)	(+)	(+)	(-)	(-)	(-)	(-)	(+)	(+)	(+)
HP	-1	0	-2	-3	-2	2	-2	-5	0	-2	-1	1	2	-1	-2	1	-3	0	-1	-2	0	-1	2	1	-2
BC	0	-1	+1	0	+1	2	2	-1	-2	2	0	0	-2	-1	-1	0	3	0	0	-2	0	-2	-2	1	-2
EZ	0	-1	+2	0	+1	2	-4	-2	3	-1	0	-1	0	1	4	0	2	0	-2	0	-1	0	0	1	-1
RM	-1	0	-2	0	-1	2	-2	1	1	0	-1	-1	3	1	0	0	1	0	0	-3	1	1	1	-2	3
KH	-1	0	-3	0	+3	0	1	1	0	-2	1	1	3	1	1	0	-2	0	-1	1	3	2	1	1	3
JD	+1	-1	0	+1	-2	0	1	2	1	3	-1	0	-2	-1	1	0	-1	0	-1	-1	-1	1	-1	-1	0
TB	-1	-1	0	-1	0	0	0	1	1	-3	0	1	0	-1	1	0	-1	-1	3	-2	-1	-1	-1	1	2
LZ	+4	+1	+1	+2	+1	1	2	2	0	-1	1	0	0	1	1	-2	0	-3	-1	0	2	2	0	0	1
MM	0	+3	-4	+1	-1	-2	1	4	0	-3	-1	-2	1	1	1	-2	-1	1	0	0	0	1	-2	2	1

NOTE: The numbers from 1 to 76 correspond to the items in the trait-universe. The plus or minus in the parentheses indicate the "positive" or "negative" nature of that item. The numbers in the Table indicate the amount of change for each item between pre and post, and the direction of that change ("improved" or "impaired").

	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	(-)	(/)	(-)	(-)	(-)	(/)	(-)	(-)	(-)	(-)	(/)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(/)	(-)	(-)	(-)	(/)	(/)	(-)
HP	0	3	0	1	-1	2	0	0	-3	1	-1	1	2	0	-1	1	1	0	-3	0	1	-1	4	-2	-2	-2
BC	0	-1	2	-2	1	-1	1	3	0	0	2	0	2	0	-2	0	2	-2	0	0	0	-1	0	-1	0	2
EZ	-3	3	-2	0	-2	1	0	1	2	0	1	1	0	3	0	-1	-2	1	3	1	1	0	-2	0	-1	-1
RM	1	2	0	2	0	1	0	-1	-1	1	1	-1	-2	0	0	-1	0	2	0	1	-1	-2	0	4	0	-2
KH	2	1	0	-3	-2	0	0	-4	0	0	-2	1	-3	-2	0	0	1	-1	2	0	1	0	1	2	0	-2
JD2	1	0	1	0	3	-1	2	-1	-1	-1	1	1	3	2	0	0	-1	0	-3	1	-1	-1	-1	0	0	1
TB	-1	-1	-1	-1	3	0	-1	1	1	0	1	0	-2	3	1	1	-1	1	-1	1	0	0	-1	0	0	1
IZ	0	0	-2	-1	0	1	-1	0	0	2	0	0	0	2	1	-1	-2	0	1	0	0	0	-1	1	1	0
MM	-1	2	0	4	-1	0	-3	-4	-2	3	-3	-2	-2	1	0	0	2	1	4	0	-1	1	-1	1	1	1



	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
	(-)	(/)	(/)	(/)	(-)	(/)	(-)	(-)	(/)	(-)	(/)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(/)	(-)	(/)	(/)	(-)	(-)
HP	-1	-1	-1	2	-1	1	0	2	0	0	-1	2	0	0	-1	-3	-1	2	3	0	0	2	-2	0	-1
BC	1	0	-1	-1	-2	0	-2	-2	0	-3	0	3	0	0	1	1	1	-2	-1	0	-1	1	0	1	3
EZ	0	0	0	-3	0	2	2	-1	0	0	1	0	0	0	3	1	-1	-3	1	1	0	0	-1	0	-2
RM	2	-2	0	-2	3	-1	0	3	0	1	0	-1	1	0	-1	-3	2	-3	1	-1	0	-1	0	0	2
KH	-1	-1	3	0	-3	-3	0	2	2	1	-4	0	-2	2	-3	0	0	-1	0	0	-2	-1	1	1	1
JD	1	0	1	0	0	1	-2	0	-1	-1	2	0	0	0	1	-1	0	0	1	2	-1	-1	1	1	0
TB	0	0	2	-1	-1	3	2	-3	-1	-1	2	0	1	0	0	0	0	0	-2	0	0	-1	1	1	-1
LZ	0	-2	1	-1	1	0	-1	-2	0	0	-3	-1	-1	2	0	0	1	0	0	-1	1	-3	-1	1	-1
MM	1	1	1	1	0	2	-2	1	0	1	-2	-2	0	2	2	-1	1	0	1	1	-2	-1	0	1	2

### FIGURE I

#### Rating Chart

Rater's Name \_\_\_\_\_

Date \_\_\_\_\_

Patient's Name \_\_\_\_\_

Most characteristic \_\_\_\_\_ Least characteristic

(1) 8      (5) 7      (12) 6      (20) 5      (20) 4      (12) 3      (5) 2      (1) 1

[illegible]

FIG. II

242

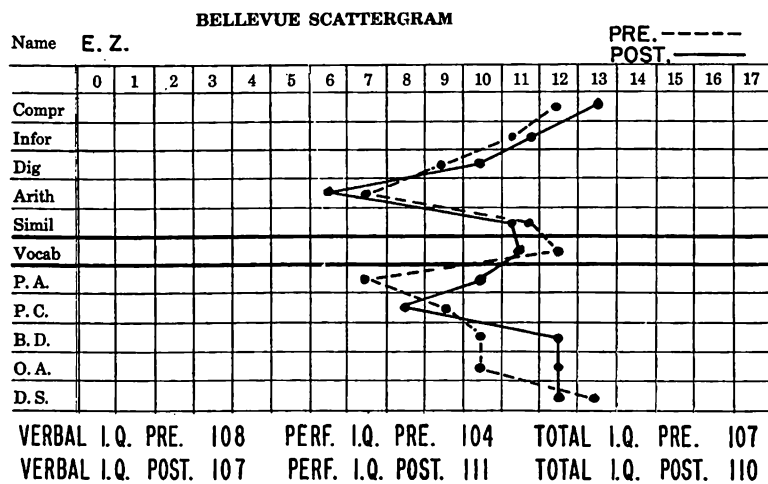
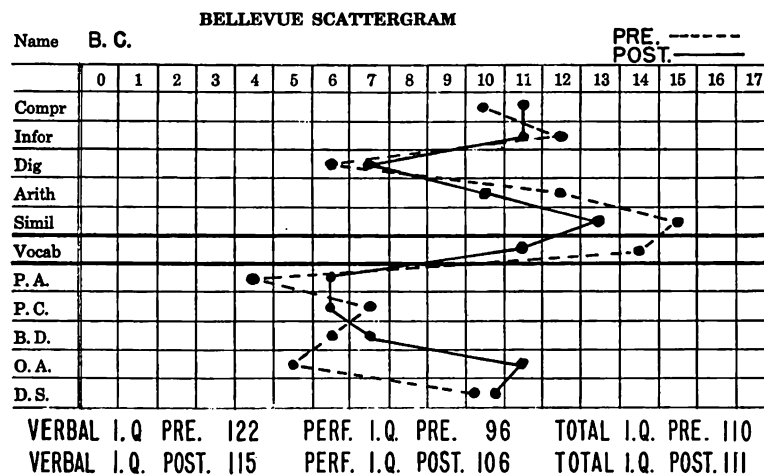
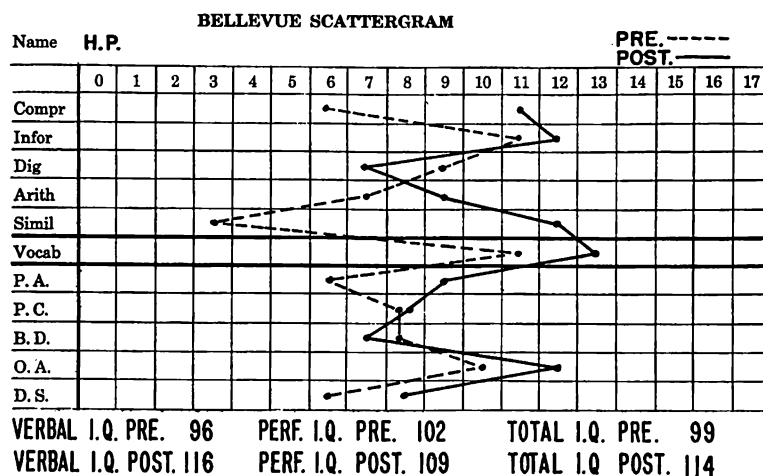


FIG. II

243

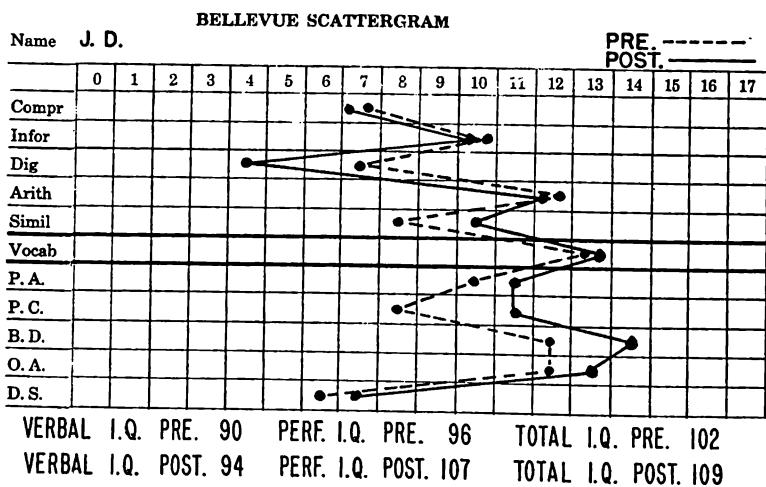
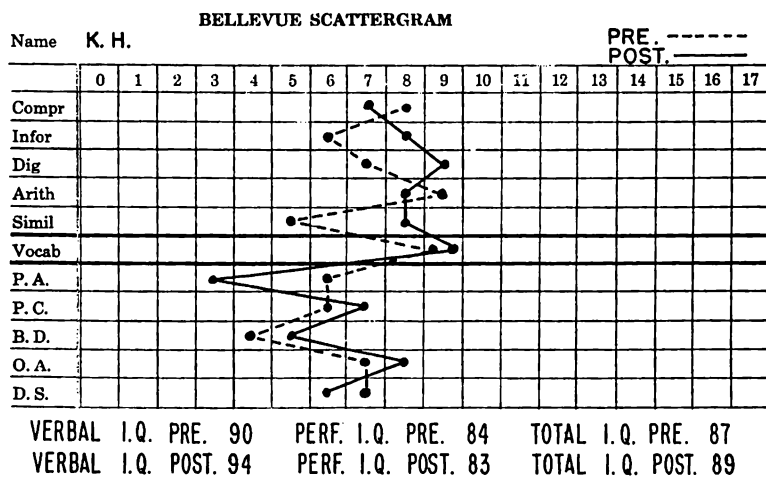
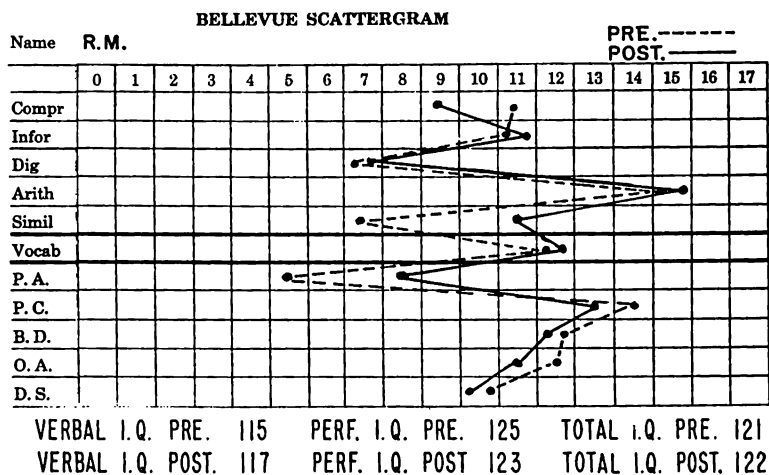


FIG. II

244

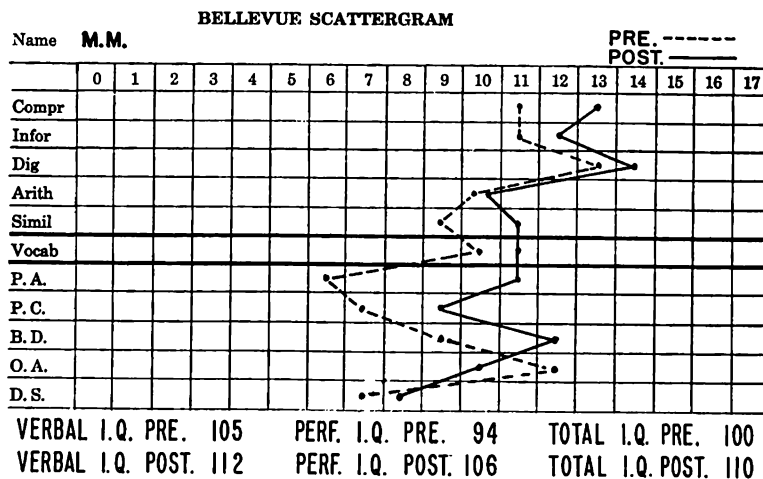
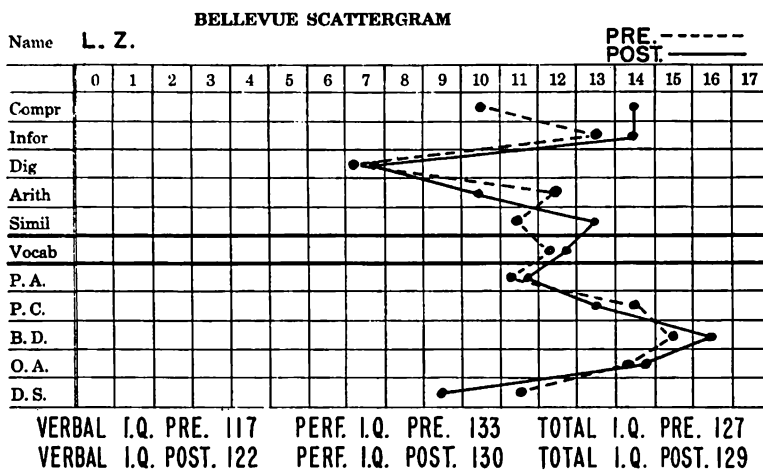
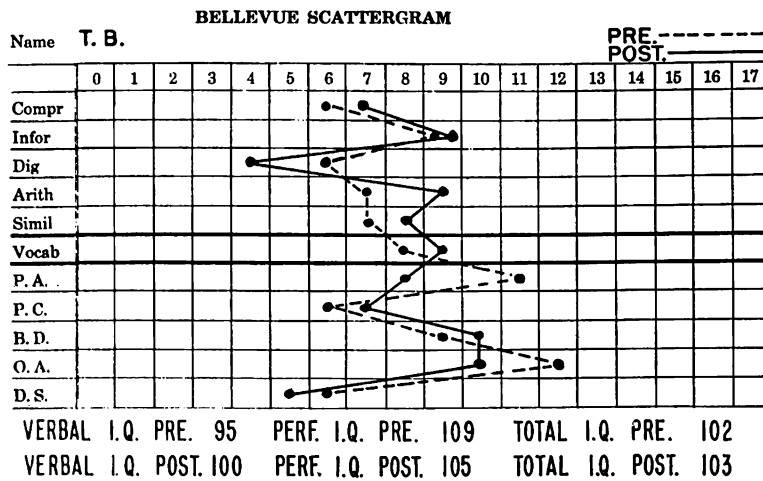
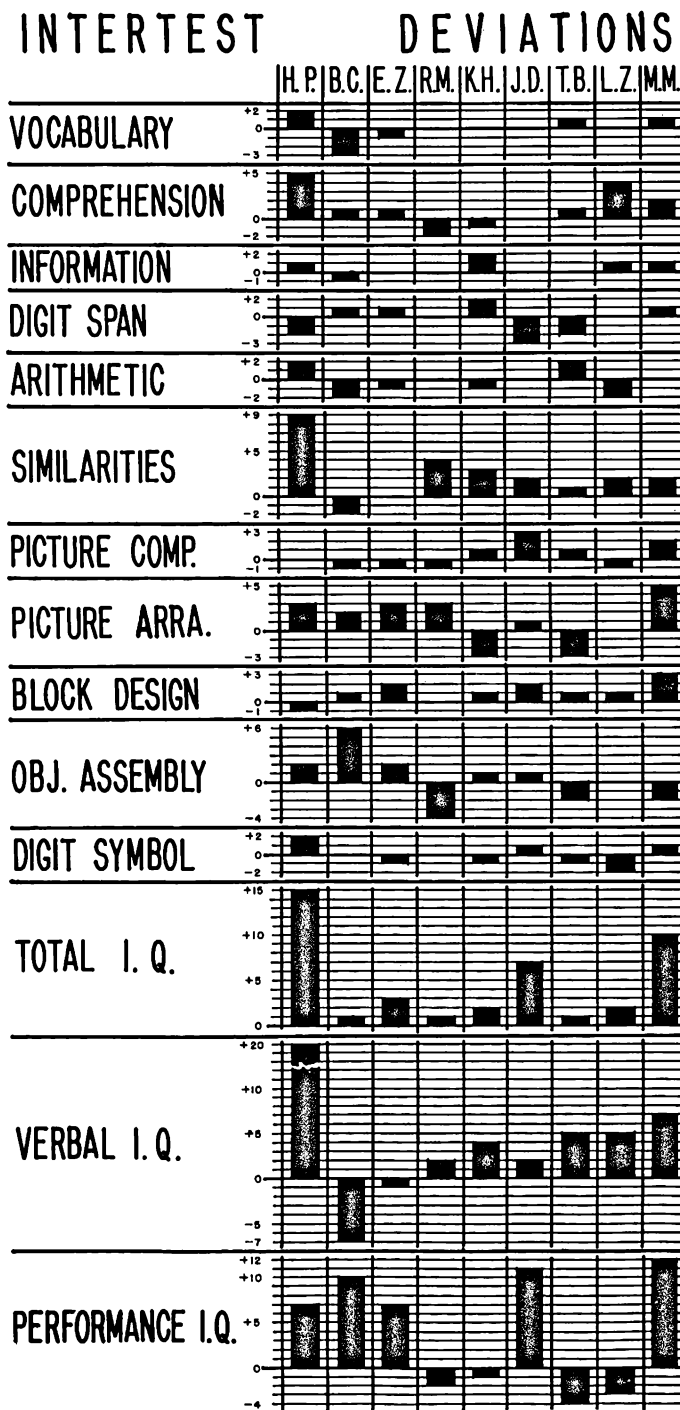


Figure 1 displays 11 bar charts, each representing a different cognitive task. The tasks are listed on the left: COMPREHENSION, INFORMATION, DIGIT SPAN, ARITHMETIC, SIMILARITIES, PICTURE COMPLETION, PICTURE ARRANGEMENT, BLOCK DESIGN, OBJECT ASSEMBLY, and DIGIT SYMBOL. The x-axis for each chart represents 11 groups of subjects, labeled at the top: HP, BC, EZ, RM, KH, JD, TB, LZ, MM. Each group has two bars: a solid black bar for 'PRE' (pre-treatment) and a stippled black bar for 'POST' (post-treatment). The y-axis represents the score for each task, with scales varying by task (e.g., -12 to 12 for COMPREHENSION, -10 to 4 for DIGIT SYMBOL). The charts show the distribution of scores for each group, with the POST scores generally showing improvement over the PRE scores.

FIG. IV  
WECHSLER-BELLEVUE



RM: (-1)

## CHAPTER XI

### B I B L I O G R A P H Y

The following bibliography is include in its entirety because it represents a fairly complete compilation of references on lobotomy up to about September of 1950. However, only those references marked with an asterisk (\*) are referred to specifically in the text.



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