

I INTRODUCTION

1. Speaking on the rehabilitation of physically handicapped people at a National Seminar on Rehabilitation Services and Research, Dr. M. Natarajan, Director of the Artificial Limb Centre, Madras observed: "We must realize that this specialized work needs an army of specially trained personnel like doctors physiotherapists, occupational therapists, medical social workers, vocational counsellors, and employment officers. It is true that one cannot wait till a large number of these are created before starting our scheme. In most places we have to start on an *ad hoc* basis, with partially trained personnel and start the process." From bold beginnings made in the Department of Ortho Surgery at the Government General Hospital, Madras, the Artificial Limb Centre has bloomed now into a full fledged unit, complete with facilities for ortho surgery, a workshop for the fabrication of artificial limbs, and a vocational evaluation unit staffed by vocational counsellors, clinical psychologists and biostatisticians, engaged in laboratory and field work. This minor project on which this report is being written has been sponsored by the University Grants Commission; and it is related to the vocational evaluation of handicapped people. It has been aimed at providing technical know how regarding psychological aspects of the major project undertaken by the Artificial Limb Centre.

II PROBLEM

2. *Nature and Extent of the Problem of*

Physical Handicap. According to information available from census figures, there are nearly one hundred and fifty thousand persons in Tamil Nadu, disabled by loss of limb, affected muscle power, nerves or bones. "Following the disability" says Mr. S. T. Markandeyan, Vocational Counsellor at the Artificial Limb Centre, Madras, "many handicapped persons experience various problems in their life. A person whose legs are paralyzed as a result of injury in the spinal cord will have to remain confined to his home. The respect that he had been receiving from his family members may slowly wane out. He may be ignored or sometimes be even neglected as the family members feel him to be a burden. Thus, disability puts innumerable blocks in every path of the life of the disabled persons — physical, familial, social, and economical. These frustrating circumstances lead to conflict, clearly manifesting symptoms of hostility, aggressive behaviour, submissiveness, dependency and withdrawal". The problem becomes more acute when one considers the plight of orthopaedically handicapped persons, since the disability deprives them of their employment opportunities. This would, of course, differ according to the type of occupation in which an individual happens to be. In the case of a watchman who loses three fingers in one hand, the disability may not be serious; but in the case of a typist, the same handicap will be a serious impediment in the efficient performance of his job. He might have to look for some other remunerative occupation.

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3. *Psychological Considerations.* Physical handicap almost invariably leads to psychological problems. Hence the need for correct vocational assessment and appropriate occupational placement which will turn out to be satisfying to the client. Medical facilities in hospitals do provide artificial limbs which certainly help the patient to compensate for the deficiency resulting from loss of limb, but this is only the beginning of the process of rehabilitation which must necessarily culminate in the placement of the medically rehabilitated individual in an occupation which makes him once more a useful member of society. "In India", observes Dr. M. Natarajan, "where unemployment is so high even among the physically fit, the competition for gainful employment is far more serious and ruthless. . . . We must remember that these personnel could effectively function only when the proper environment is created in terms of institution, equipment, and other ancillary and supportive requirements". In short, it is vitally necessary to direct the handicapped person into the choice of an occupation which he will accept as his vocation; and will find satisfaction not only in what he earns but also in what he does, along with those who happen to be his co-workers. All this underlines the need for systematic planning and a scientific assessment of vocational possibilities.

III PROCEDURAL REQUIREMENTS

4. *Process of Vocational Guidance for the Handicapped.* The aim and purpose of vocational guidance, as it applies to handicapped people, is to help the individual to settle in a job for which he is fit, despite his handicap, so that he may be able to earn a living, restore his independence and self respect, and overcome the depressing feeling of the basic deficiency which made

him dependent on his family and on society. The process of vocational guidance consists of six steps:

(a) First, the individual has to be carefully examined by the administration of suitable tests which will give a reliable measure of his abilities and aptitudes. It is necessary, also, that he should be interviewed, so that the vocational counsellor may gain a clear idea as to where his true vocational interests lie.

(b) Secondly, on the basis of the data emerging from the tests and interview, a realistic evaluation of his vocational potentialities has to be made.

(c) The third step is the vocational counselling procedure, which seeks to create in the mind of the client an awareness of his capabilities and limitations. The vocational counsellor is bound by the golden rule of the client's right to self determination.

(d) After the client has made a tentative choice of his preferred vocation, the fourth step will be to provide for the client opportunities for pre-vocational or vocational training. In the case of persons who are fit to return to their former occupations, the guidance process will end at this stage.

(e) Fifthly, on completion of training, the client will have to be placed in a job for which he has been duly trained. This will have to be done with the collaboration of an employment agency. It may not, however, be that at the end of the training period, an individual has developed all the skills needed for adequate performance of the job. Hence a period of on-the-job training is usually necessary.

(f) The sixth step in the vocational guidance procedure is to follow up the individuals placed in different jobs, and to

ascertain the gain in job proficiency resulting from experience on the job.

It will be evident from this that the rehabilitation of physically handicapped persons is not a random process, but one which calls for career planning, and foreseeing accurately what a person is capable of doing. Psychological tests are tools which point to different possibilities; but in the last analysis, much would depend on the insight of the vocational counsellor; and the way in which the client cooperates with him in the effort to achieve a solution to the problem created by the bodily deficiency.

IV METHOD

5. *Psychological Techniques.* In January 1969, when the request was made by the Director, Artificial Limb Centre, Government General Hospital, Madras, for assistance in connection with the psychological evaluation of amputees, a scheme of tests was drawn up, and a complete set of test equipment was made available on loan to the Vocational Testing and Evaluation Laboratory set up at Government General Hospital, Madras. A battery of nine tests was initially recommended for use. These were Tests Nos. A.P. 10, 11, 12, 13, 14, 15, 50, 51, and 52. Details regarding test administration, scoring, and evaluation were provided in the handbook entitled, *Psychomotor Aptitude Tests in the Tower System of Vocational Evaluation for Handicapped People.* (No. C. Psy. 69015). The Vocational Counsellor, who was given full training in the administration of these tests, was advised to select tests appropriate to each individual case, and to use any other standardized tests which would be helpful in assessing the vocational potential of his clients. It was also emphasized that test administration should invariably be supplemented by a vocational interview,

prior to imparting counselling to the client. The data now available from the Artificial Limb Centre, based on testing carried out between August 1969 and January 1971, consist of scores based on seven tests, which fall into three groups:

(a) First, *the measurement of intelligence*, based on the administration of Bhatia's battery of intelligence tests. From the scores on this battery, consisting of five tests, the intelligence quotient of each person tested was calculated. A total of fifty clients was tested, and their respective intelligence quotients worked out.

(b) Secondly, the following *psychomotor aptitude tests*, drawn from the group of nine initially recommended for use were administered:

- (i) *Test No. A.P. 11 (Pegboard Test)*, administered to 67 persons.
- (ii) *Test No. A.P. 14 (Mirror Doting Test)*, administered to 54 persons.
- (iii) *Test No. A.P. 51 (Manual Dexterity)*, administered to 55 persons.

(c) Thirdly, a group of *standardized aptitude tests* was also administered. These were the O'Connor Tweezer Dexterity Test, the Bennet Hand Tool Dexterity Test, and the O'Connor Finger Dexterity Test. The use of these tests, standardized in the USA, was recommended by advisers from the Vocational Rehabilitation Administration of the United States Department of Health, Education and Welfare.

6. *Counselling Technique.* All the tests were reported to be working satisfactorily. The Vocational Counsellor based his counselling techniques on test indications and interview findings. During the period

under review, altogether 75 persons were counselled by him.

7. *Purposes of this Report.* The purposes of this report are :

(a) First, to analyze the findings of test data based on the psychological tests administered by the Vocational Counsellor.

(b) Secondly, to see how the scores obtained from tests administered to handicapped people, who constitute the experimental group, compare with those to college students, who make up the control group in this experimental study.

(c) Thirdly, to evaluate the usefulness of these tests as a basis for effective Vocational Counselling.

V ANALYSIS OF DATA

8. *Measurement of Intelligence.* It is believed that intelligence is the best single predictor of occupational success. Although this has not been established in the case of individuals covered by this research study since measures of occupational success of the persons tested have yet to be made, the claim has been accepted tentatively, and the assessment of intelligence levels has been undertaken by the administration of Bhatia's battery of intelligence tests, which have been standardized for use in India. The summary of data is shown in Table I. From such a small sample, no real conclusion can be drawn, but it is evident that more than half the number of persons tested fall below the normal level of intelligence. One underlying factor might be that these have been drawn from the semi-skilled and unskilled occupations. As such most of them have been advised to change from one type of unskilled occupation to another.

9. *Psychomotor Test of Finger Dexterity.* (Test No. A.P. 11). The task set in

TABLE I
LEVELS OF BASIC INTELLIGENCE
Intelligence Quotients according to
Bhatia's Test

Classification	Range of IQ	Number of Persons
A — Superior	130 and above	1
B — Bright Normal	110 to 129	6
C — Normal	90 to 109	16
D — Dull Normal	75 to 89	21
E — Inferior	Below 75	6
		Total 50

this test was to pick up one inch metal pegs and fit them into slots on a board. The score, expressed as a percentage is determined by the speed with which pegs are inserted, first by the right hand, then by the left, and finally by both hands. The summary of data, for handicapped and normal persons, appears in Table II.

TABLE II
SCORE VALUES ON THE FINGER
DEXTERITY TEST

Values	Handicapped Persons	College Students
Number Tested	67	98
Score Ranges (Percent)	28 to 57	24 to 69
Mean Value of Score	50.09	56.24
Standard Deviation	1013	9.12

Individuals were graded on a five point scale, depending on their respective scores. The numbers falling in each of the five gradings are shown in Table III.

Although the difference between the experimental and the control groups is not very striking, it will be evident that the mean scores and gradings of college students are distinctly higher than those of handicapped persons.

10. *Psychomotor Test of Eye Hand Co-ordination.* (Test No. A.P. 14). The task

TABLE III
GRADINGS BASED ON SCORES IN FINGER
DEXTERITY TEST

Gradings	Handicapped Persons	College Students
A	0	5
B	4	27
C	39	52
D	23	14
E	1	0

set for this test was to insert dots with a pencil, on a star pattern of small circles, under the guidance of the reflection of the printed paper in a mirror. Since the image on the mirror reflects the reverse of what is on the paper, the movement of the hand has to be adjusted by a watchful use of the eye. The score in this test is determined by the number of dots correctly inserted within a time limit of sixty seconds. Score values are shown in Table IV.

TABLE IV
SCORE VALUES ON THE EYE-HAND
COORDINATION TEST

Values	Handicapped Persons	College Students
Number Tested	54	98
Score Range (Percent)	2 to 72	12 to 75
Mean Value of Scores	38.84	42.71
Standard Deviation	7.19	7.89

In this test, also, individuals were graded on a five point scale, depending on their respective scores. The numbers falling in each grade are in Table V.

Although the mean score of the experimental group is not very much lower than that of the control group, the proportion of handicapped persons falling in the lower gradings, D and E, is distinctly higher than that of those belonging to the group of college students.

TABLE V
GRADINGS BASED ON SCORES IN THE EYE-
HAND COORDINATION TEST

Gradings	Handicapped Persons	College Students
A	2	7
B	14	23
C	13	44
D	14	21
E	11	3

11. *Psychomotor Tests of Manual Dexterity.* (Test No. A.P. 51). The task set in this test was to fill a matchbox with thirty matchsticks, using a safety razor blade to lift the sticks and drop them in the box. The score is determined by the time taken to complete the task. The summary of data for handicapped persons and college students is given in Table VI.

TABLE VI
SCORE VALUES ON THE MANUAL
DEXTERITY TEST

Values	Handicapped Persons	College Students
Number Tested	55	98
Score Ranges (Percent)	18 to 60	24 to 76
Mean Value of Scores	51.31	56.47
Standard Deviation	11.2	9.73

Here again, individuals were graded on a five point scale, depending on their respective scores. Numbers falling in each of the five gradings are shown in Table VII. It will be evident here that the mean score of the experimental group is not very much lower than that of the control group, and that the proportion of persons in both groups, placed in the five different gradings is more or less on par. In brief, there is no marked difference between handicapped persons and college students with regard to manual dexterity.

TABLE VII
GRADING BASED ON SCORES IN THE
MANUAL DEXTERITY TEST

Gradings	Handicapped Persons	College Students
A	2	5
B	27	31
C	21	47
D	3	14
E	2	1

12. *Aptitude Test Scores.* The three standard tests of aptitude, used in connection with the project on vocational evaluation of handicapped people were the Bennet Hand Tool Dexterity Test, the O'Connor Finger Dexterity Test, and the O'Connor Tweezer Dexterity Test. The Bennet Test was administered according to the procedure laid down by George Bennet, and published by the Psychological Corporation, USA. The two O'Connor Tests were administered according to instructions given in the publications of Messrs Stoelting Co., Chicago, USA. Scores were recorded according to the number of seconds taken to complete the tasks set for these three tests. On this method of scoring, those taking less time to complete the job would rank higher than those taking more time. The summary of data for the three aptitude tests is in Table VIII.

TABLE VIII
SCORE VALUES ON APTITUDE TEST

Values	Hand Tool Dexterity Test	Finger Dex- terity Test	Tweezer Dexterity Test
No. of Persons	32	38	35
Time Ranges	227 to 2141 Secs	227 to 489 Secs	316 to 820 Secs
Mean time	925 Secs	271 Secs	516 Secs
Standard Deviation	231 Secs	54 Secs	86 Secs

Since no data for college students is available, it is not possible to compare the performance standards of handicapped people in these tests with a control group. However, wide differences in the mean time taken to complete the three different tasks are evident. The Hand Tool Dexterity Test is the most complex task, involving unwinding from one end and fixing on the other end of the test device. The Tweezer Dexterity Test is less complicated, and the Finger Dexterity Test is the simplest. These tests have been found useful in deciding how well the individual is likely to do when put on work involving the handling of machinery and machine tools. Individual differences appear to be most marked in the case of the hand tool dexterity test and least in respect of the tweezer dexterity test.

VI DISCUSSION

13. *Evaluation of Test Programme.* Three questions of practical concern, merit attention in this connection:

(a) How well do the tests used in this programme measure psychomotor capabilities and aptitudes of the handicapped persons?

(b) Is there a workable relationship between test findings and vocational counselling procedures?

(c) Has vocational counselling been of some avail in the rehabilitation of handicapped persons?

Although it may not be possible to furnish conclusive answers to these questions, it ought to be possible to detect a few pointers from the limited range of evidence now available. It must be remembered that this study has been in the nature of a pilot study; and that future work on this problem will need to be adapted in the light of the conclusions emerging from this study.

14. *Psychomotor and Aptitude Tests.* In the first place, it would be useful to consider the relationship between the Psychomotor Tests and the Standard Aptitude Tests administered in this study, since it is important to know whether those who scored high on Psychomotor Tests fared just as well in the Aptitude Tests. The relationship between the scores in these two types of tests has been determined by calculating the coefficients of correlation between different tests, using the rank difference formula. The values are shown in Table IX.

TABLE IX
CORRELATION BETWEEN PSYCHOMOTOR AND
APTITUDE TESTS

Tests	Hand Tool Dexterity	Finger Dexterity	Tweezer Dexterity
A.P. 11 Finger Dexterity	*	*	NS
A.P. 14 Eye-Hand Coordination	0.325	0.681	0.210
A.P. 51 Manual Dexterity	*	*	*
	0.413	0.386	0.395
	**	NS	*
	0.536	0.136	0.409

* Significant; NS — Not Significant; DF=27

** Highly Significant.

From the above table, it is evident that there is generally a satisfactory relationship between the psychomotor tests and the standard aptitude tests. Only two values out of nine are not statistically significant. All things considered, it would be fair to say that this battery of six tests hang reasonably well together. Nevertheless, the sample of cases examined in this study is exceedingly small as compared with the total of 1,43,872 cases of handicapped persons in Tamil Nadu. In this study, between 32 and 67 persons were given the different tests. Only 29 persons took all the six tests. This study has in fact been restricted to cases treated at the

Artificial Limb Centre at the Government General Hospital, Madras. All the same, the scores of the handicapped persons tested in this study compare favourably with the scores of college students, who have been taken as a control group. For practical purposes, then, the mean values of test scores obtained so far may be tentatively accepted as a fair representation of the performance levels of handicapped persons. A few illustrative cases, recorded by Mr. S. T. Markandeyan, Vocational Counsellor at the Artificial Limb Centre, Madras, are given in Appendix 'A', attached to this report.

15. *Test Findings and Counselling Procedures.* In the second place, when one goes into the question as to how far the test data have helped the vocational counsellor to pitch his ideas at the right level, one has to depend for the answer on the testimony of the vocational counsellor, Mr. S. T. Markandeyan, who has reported that all the six tests were found to work satisfactorily. With regard to his own responsibilities in the matter, Mr. Markandeyan says: "Only to a certain extent it was possible to identify the vocational problems of patients. From the analysis of the unsettled patients it was found that 65% of them had difficulties in adjusting with their jobs. If these patients are evaluated by means of psychological tests, the vocational guidance of the orthopaedically handicapped would bring about good results." In addition to the use of psychological tests, the vocational counsellor is also engaged in making pre-vocational evaluation of his clients by taking work samples which could be used according to the specific vocational preferences of his patients. "Finally", observes Mr. Markandeyan "On-the-job training for a short period will also be given to find out the work potentialities of the patients. All these

steps are expected to help amputees for settling with some suitable jobs".

16. *Vocational Choices based on Interview Techniques.* Vocational interview with the counsellor is a very important stage in the rehabilitation programme. These interviews have been conducted with meticulous care, with due regard for the client's preferred interests and also for the evidence regarding his vocational slants, gauged from test results. The fundamental consideration has been to arrive at a realistic appraisal regarding what the person can do and what he is incapable of doing. In some cases, the patient has had to be tried out on a job and assessed not only by the Vocational Counsellor, but also by an expert in the profession before a decision was reached. An example of this is given in Appendix 'B', entitled *Vocational Evaluation Study in the Work Situation*. In this particular instance it was found that aptitude test indications were borne out by observation of the case in the work situation. Out of 75 persons tested, interviewed, and recommended for different occupations during the period under review, the occupation-wise distribution is as follows:

TABLE X

JOB CLASSIFICATION OF HANDICAPPED PERSONS TESTED AND INTERVIEWED

Types of Occupation	Number
1. Shop Keeper / Shop Assistant	18
2. Pre Vocational Training/Studies	14
3. Industrial Employment	15
4. Agricultural Work	3
5. Clerk / Office Assistant	6
6. Tailoring	4
7. Laundry Work	1
8. Barber	1
9. Contractor / Store Keeper	2
10. Milkman	1
11. Manual Labour (unskilled)	6
12. Unspecified	4

17. *Tests Versus Interviews.* In general, it may be said that although it is not easy in every case to reconcile the indications of test findings with the clients preferred interests, as expressed in the interview, every possible effort was made by the vocational counsellor to arrive at a reasonably satisfactory vocational choice which usually fitted with test indications. There can be no doubt, then, that vocational counselling procedures have proved to be meaningful to the client and generally in accordance with psychological test findings.

18. *Vocational Counselling as an Aid to Rehabilitation.* The third question of practical concern is regarding the extent to which the techniques of vocational counselling have proved to be helpful to handicapped persons in finding suitable occupations. In this matter, the vocational counsellor has to depend on the cooperation of the Employment Officer. Merely to find that an individual possesses aptitude for the job, let us say, of an electrician, and to issue a fitness certificate or letter of recommendation is not enough. The individual has to be placed in a job suitable for him. According to the latest Report on the Research and Demonstration Project of the Artificial Limb Centre at Madras, "among the 104 persons who received our fitness certificate and Recommendation letter only 31 could get jobs. Some of them could not resettle even after assistance and they found employment by themselves". In some cases, it was possible for the client to return to his former occupation after undergoing treatment. In others, it has been found necessary to put the client through a period of pre-vocational training before fitting him into a job. In yet a few cases it has been found possible to effect a change of occupation without imparting pre-vocational training. A small percentage of individuals have found their initial

placements based on vocational counselling to be unsuitable, and were therefore obliged to make a change on their own. As is to be expected, there have been some who were not able to settle down in any job. These were, of course, psychological problem cases. The distribution of cases is shown in Table XI.

TABLE XI

PERCENTAGES OF HANDICAPPED PERSONS
CLASSIFIED BY OCCUPATION

Classification	No. of Cases	Percentage
1. Continuing in Previous Occupation	17	22.0
2. Undergoing Pre-vocational Training	7	9.75
3. Continuing Education	7	9.75
4. Awaiting Change of Occupation	16	21.0
5. Adjusted to Changed Occupation	12	16.0
6. Occupation different from what was Advised	6	8.25
7. Unsettled, Unemployed	9	12.0
8. Dead	1	1.88

From the above table it will be evident that nearly one fourth of the clients studied during the period under review, and provided with vocational counselling, found it possible to continue in the same occupation in which they were engaged before undergoing treatment. All that they required was some sort of assurance from the vocational counsellor that they could, with some minor adjustments, cope with their jobs. As many as 16%, that is about one in every six clients interviewed, settled down satisfactorily in a changed occupation, and about one fifth awaited change of occupation. One tenth went on to pre-vocational training. If these numbers were put together, it would appear that more

than half the number of persons receiving vocational guidance had to make a change of occupation after undergoing treatment, and not more than one in ten continued to remain unemployed. From these facts, it would follow that vocational interviewing has been quite helpful in the process of rehabilitation.

19. *Work Samples.* Psychomotor tests and Aptitude Tests do no doubt indicate a person's slants, but even so they are of a general nature; and the potentiality for skills evident from scores on these tests may not always tell exactly what job a person will best fit into. Thus, a high level of finger dexterity is called for in several occupations such as typing, printing, tailoring, machine assembly and so forth. Again, manual dexterity of a high order is demanded in jobs like carpentry, brick-laying, materials handling, spot welding and the like. It will therefore be useful to supplement the findings of aptitude tests by further tests based on work samples. A Work Sample Test is based on specific action patterns involved in a particular job. The job has first to be analyzed and broken down into basic movements of hand and foot. The test has then to be constructed so that the sequence of operations in the performance of the job is simulated in the design of the test. This has to be done for a number of occupations, so that an individual who shows promise, as judged by his score in the aptitude test, or who expresses preference for a particular job such as tailoring, carpentry or welding, could be given the work sample test, and he may be told which specific occupation would be the most suitable for him. The Artificial Limb Centre is now developing tests based on Work Samples, and these tests are being standardized for future use.

III SUMMARY OF CONCLUSIONS

20. This study, relating to vocational evaluation of handicapped people, at the Artificial Limb Centre, Government General Hospital, Madras, covered a total of seventy-five cases of persons fitted with artificial limbs. An intelligence Test battery and six Psychomotor and Standard Aptitude Tests were administered to groups varying in size between thirty-two and sixty-seven individuals. The main findings emerging from the analysis of data are as follows:

- (a) With regard to levels of basic intelligence, more than half the number tested fell below the normal level of intelligence, presumably because they were drawn from persons engaged in semi-skilled occupations.
- (b) In psychomotor tests of finger dexterity, eye hand coordination, and manual dexterity, the mean scores of the experimental group, consisting of handicapped people, did not fall far below the scores of the control group, consisting of College Students.
- (c) In the standard Aptitude Tests of Hand Tool Dexterity, Finger Dexterity and Tweezer Dexterity, wide differences were evident in the mean time taken to complete the tasks set in the tests. Hand Tool Dexterity was the most complex and finger dexterity was the simplest of the tests.
- (d) Correlations between psychomotor aptitude and standard aptitude tests were statistically significant in seven out of nine cases. The six tests appeared to hang together well, and they have been accepted by the Vocational Counsellor as a useful indicator of potentiality for vocational training.
- (e) The Vocational Counsellor found the tests to be helpful in guiding his clients in making appropriate occupational choices.
- (f) Although it was not easy in every case to reconcile test findings with the client's preferred vocational interests, counselling procedures have been guided largely by test indications.
- (g) In more than half the number of cases, a change of occupation was found necessary after treatment at the Artificial Limb Centre. One in four were able to continue in the same occupation, and one in ten remained unsettled.
- (h) Now that a satisfactory position has been reached with regard to aptitude testing, Vocational Evaluation will in future be based on Aptitude Test findings supplemented by indications of tests based on Work Samples.

APPENDICES

Appendix 'A' — Illustrative Cases.

Appendix 'B' — Vocational Evaluation Study in Work Situations.

'APPENDIX 'A'

ILLUSTRATIVE CASES

(Extract from Report by Thiru S. T. Markandeyan, Vocational Counsellor Artificial Limb Centre, Government General Hospital, Madras)

Case No. 1

Patient K. B., 39 years old, is an above knee amputee. He lost his leg in an accident while at work in Madras. He could not go back to his former job, on account of his disability, and he needed guidance in the choice of a suitable alternative job. He was educated up to the eighth standard

and he showed interest in skilled work. All the six tests were administered. The scores indicated that he had a fairly sound manual dexterity.

Case No. 2

Patient G. B., 16 years is a bilateral amputee (both lower limbs), who had studied Up to the tenth standard. He had no previous work experience. He wanted to do any kind of suitable job. In the interview, he evinced an interest in mechanical jobs. Results of aptitude tests revealed that he was comparatively better placed in mechanical aptitude.

Case No. 3

Patient R. D., 18 years, is a bilateral amputee, who lost his right leg below knee level and left hand at below elbow level as a result of an electric shock. His education Was up to the sixth standard. He had no Work experience. In the vocational interview, he expressed preference for any kind of repetitive job such as packing. He was just average in all the aptitude tests.

Case No. 4

Patient R. N., 22 years, is a bilateral amputee, who lost one leg and one hand in a train accident. His education was up to the seventh standard. In the vocational interview, he gave indications of good motivation and expressed interest in assembling work. He had been a gas welder on the Railways. He was given the manual: dexterity test and the mirror dotting test. Results showed that he was slightly above average.

APPENDIX 'B'

VOCATIONAL EVALUATION STUDY IN WORK SITUATION

(Reported by Thiru S. T. Markandeyan, Vocatonal Counsellor, Artificial Limb

Centre, Government General Hospital, Madras)

The patient was taken by the Vocational Evaluators to Mr. Jayaraman, Tailor, Madras-1. The tailor had nine years of experience. The object of the study was to find out whether the patient could take up tailoring work, in which he had six months of apprenticeship.

The following tasks were given and the time noted. It was checked against performance by the tailor. The following table shows it clearly.

Precautions Taken: The tailor was requested to do the task as quickly as he could, and not to sympathise with the patient, slow the rate and equalise his time with that of the patient.

Tailor's Opinion: "For six months experience, the patient has picked up a lot and his work is neat and tidy. He would do well in tailoring".

Analysis of Data: For pressing the pedal, equal amount of time is taken, both by the patient and the tailor. For stitching vertically also, equal' amount of time is taken. In fact, the tailor has taken 0.01 sec more, for stitching with the left leg. For stitching an oval shape, however, the patient has taken more time than the tailor. Though the time taken by the patient for Kaja and buttoning is more, it is compensated by neatness of work, manifested in well shaped intervals of the stitched yarn, close knitting etc. For cutting, the patient has taken more time. He needs more practice in this. For inserting the yarn in the needle, the patient has taken just 0.01 sec more than the tailor. (The stitched material etc. are preserved in a file).

Evaluators' Assessment: (1) The patient could take to tailoring work with some

Tasks	Time take by the patient	Time taken by the tailor	Observations Patient	tailor
1. With both legs—pressing the pedal : 50 times.	0·18 secs	0·18 secs	—	—
2. With normal left leg—pressing the pedal : 50 times	0·18 secs	0·18 secs	—	—
3. With the prosthesis—pressing the pedal : 50 times	2·15 secs	—	Staggered a little	—
4. Stitching 1' vertically with the normal left leg	0·09 secs	0·10 secs	—	—
5. Stitching 1' vertically with both the legs	0·09 secs	0·09 secs	—	—
6. Stitching in an oval shape (10") with left leg	0·11 secs	0·07 secs	—	—
7. Stitching in an oval shape (10") with both legs	0·12 secs	0·09 secs	—	—
8. Taking Kaja	2·38 secs	1·53 secs	—	—
9. Stitching pants button with four holes	1·05 secs	0·34 secs	Neat	Hurried
10. Stitching shirt button with four holes	1·13 secs	0·35 secs	well and spaced	Not neat not neat
11. Inserting yarn in needle	0·09 secs	0·08 secs	neat	—
12. Cutting jacket 15" length and 36" body	3·46 secs	1·08 secs	—	—

more practice. He has the necessary dexterity and interest. It is to be admitted that the prosthesis will only be a support while pressing the pedal, and effective operation cannot be performed by the prosthesis. The observation reveals that with the normal leg alone, pressing could be done more effectively. If both legs are used, the artificial limb slips off and becomes a hindrance to speed.

(2) The test results of psychomotor tests

reveal that the patient possesses above average finger dexterity and tweezer dexterity. His mechanical aptitude is also up to the mark. All these go to show, along with his proficiency shown in tailoring, that he has a noticeable aptitude for tailoring. Finger dexterity is necessary for running the cloth along, while stitching, and the tweezer dexterity comes into play in cutting jackets, shirts and pants. Mechanical aptitude however is an additional factor.