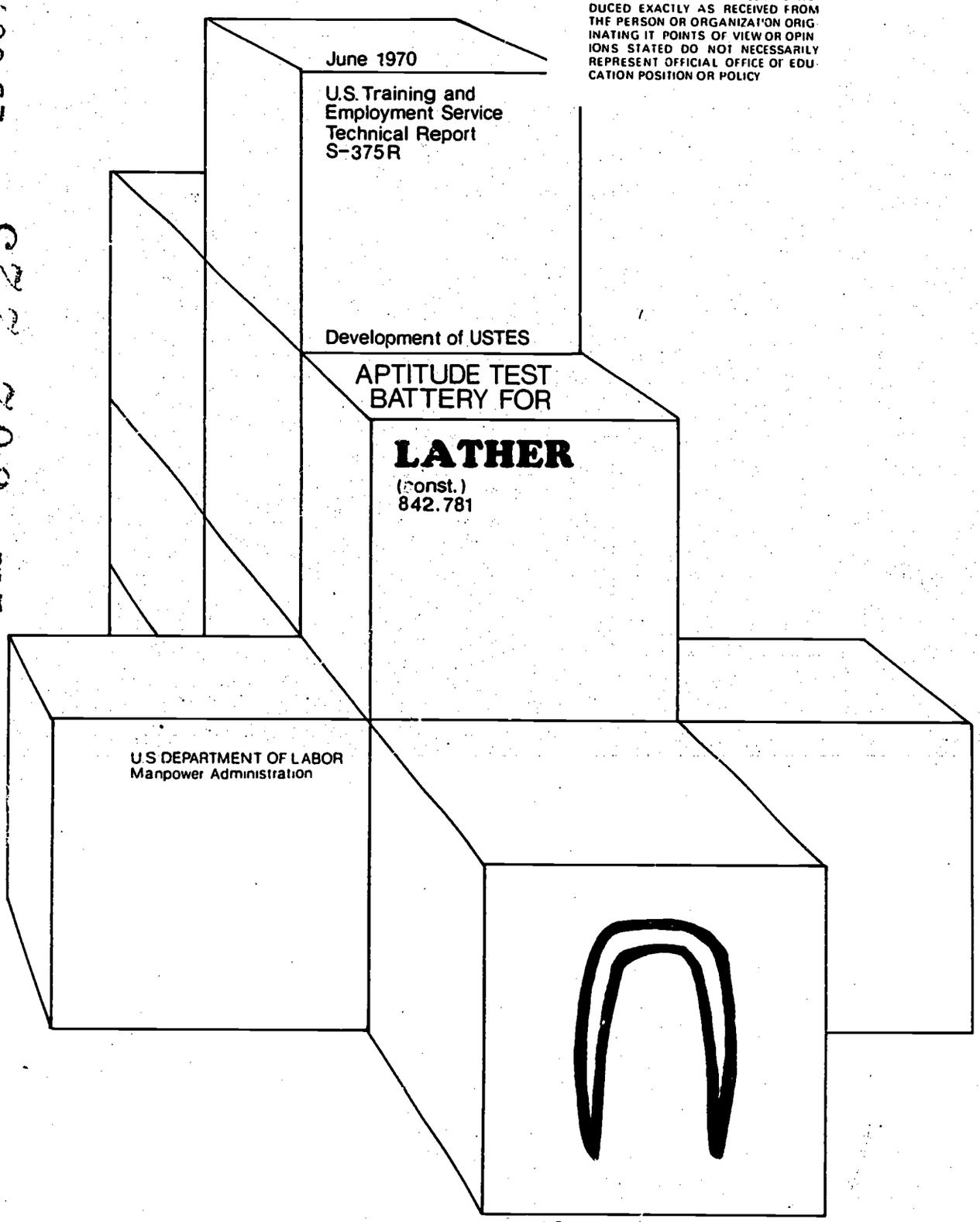
DOCUMENT RESUME

ED 069 770 TM 002 225

TITLE	Lather (const.) 842.781-010--Technical Report on Development of USTES Aptitude Test Battery.
INSTITUTION	Manpower Administration (DOL), Washington, D.C. U.S. Training and Employment Service.
REPORT NO	USTES-TR-S-375R
PUB DATE	Jun 70
NOTE	16p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Aptitude Tests; *Building Trades; Carpenters; *Cutting Scores; Evaluation Criteria; Job Applicants; *Job Skills; Norms; Occupational Guidance; *Personnel Evaluation; Test Reliability; Test Validity
IDENTIFIERS	GATB; *General Aptitude Test Battery; Lather

ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)



Technical Report on Development of USTES Aptitude Test Battery

For . . . .

Lather (const.) 842.781-010

S-375R

(Developed in Cooperation with the California, Illinois, and New Jersey State Employment Services)

U. S. Department of Labor
Manpower Administration

June 1970

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

GATB Study # 2604

Development of USTES Aptitude Test Battery

For

Lather (const.) 842.781-010

S-375R

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Lather (const.) 842.781-010. Mr. Leo C. Schultz, Executive Director of National Lathing Industry's Joint Apprenticeship Program was helpful in obtaining local cooperation for this study and in reviewing the research results. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB, B-1002 Scores
N - Numerical Aptitude	80
S - Spatial Aptitude	85
M - Manual Dexterity	75

Research Summary

Sample:

64 employed workers in California, Illinois, and New Jersey.

This study was conducted prior to the requirement of providing minority group information. Therefore, minority group status is unknown.

Criterion:

Supervisory ratings.

Design:

Concurrent (test and criterion data were collected at approximately the same time).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores. standard deviations, aptitude-criterion correlations and selective efficiences.

Concurrent Validity:

Phi Coefficient = .37 ($P/2 < .005$)

Effectiveness of Norms:

Only 69% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 80% would have been good workers. 31% of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 20% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1.

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	69%	80%
Poor Workers	31%	20%

SAMPLE DESCRIPTION

Size:

N = 64

Occupational Status:

Employed workers (Journeyman Lathers-Apprenticeship 36 months).

Work Setting:

Workers were either employed at the following companies or on file with the Lathing Institute of Southern California:

1. McNaulty Bros. Company, 930 W. Division St., Chicago, Ill.
2. Olson Lathing Company, 7404 Madison St., Forest Park, Ill.
3. Ostick Lathing Company, 6141 N. Keating Ave., Chicago, Ill.
4. Viking Lathing Co., 5449 W. Franklin St., Oak Lawn, Ill.
5. John A. Edy Co., 7955 S. Mozart Ave., Chicago, Ill.
6. Carl Dworak Lathing Co., 4923 W. Carmen Ave., Chicago, Ill.
7. T. J. McGlone & Co., Rahway, New Jersey.
8. L. A. Lathing Co., 6019 S. Manhattan Pl., Los Angeles, Calif.
9. Lathing Institute of Southern California, 410 Rosenell Terrace, Los Angeles, California.

Employer Selection Requirements:

Education: High School graduate or G.E.D. Sheet metal and/or wood shop helpful. Speak, read, and write English.

Previous Experience: Completed apprenticeship. (Wood lathers 36 mo's., Metal lather 39 mo's).

Tests: None used.

Principal Activities:

The job duties for each worker are comparable to those shown in the job description in the Appendix.

TABLE 2

Means, Standard Deviations (SD), Ranges, and Pearson-Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

	Mean	SD	Range	r
Age (years)	34.9	9.8	21-62	.280*
Education (years)	11.2	1.6	7-15	-.077
Experience (months)	162.8	114.7	37-540	.333**

*Significant at the .05 level
**Significant at the .01 level

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B were administered to the sample.

CRITERION

The criterion consisted of two ratings made by the first line supervisor of each worker, with a time lapse of at least two weeks between the first and second ratings.

Rating Scale:

Form SP-21 "Descriptive Rating Scale". Consisted of nine items with five alternatives for each item. The alternatives indicate the different degrees of job proficiency. (See Appendix)

Reliability:

A reliability coefficient of .892 was obtained between initial ratings and reratings.

Criterion Distribution:

Possible Range:	18-90
Actual Range:	38-90
Mean:	66.4
Standard Deviation:	11.2

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 31% of the sample in the low group to correspond with the percentage of workers considered to be unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers." The criterion critical score was 62.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitudes S and M which do not have high correlations with the criterion were considered for inclusion in the norms because the qualitative analysis indicated that these aptitudes were important for the job duties and the sample had a relatively high mean score on these aptitudes. Aptitude N was considered for inclusion in the trial norms because Aptitude G, which qualified for consideration, was eliminated from consideration in this reanalysis in order to minimize the verbal requirements of the battery. (In the composition of Aptitude G, arithmetic reasoning has the highest factor loading.)

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performed)

Aptitude	Rationale
G - General Learning Ability	Needed to read and interpret blueprints, to learn the operation and maintenance of various power tools, for initiative of making adjustments to conform to specifications, for alertness in avoiding injury to self and others, and in supervising personnel.
S - Spatial Aptitude	Needed to visualize, from blueprint representation, final form that work will take; to be able to maintain spatial relationship between installation being made and final dimension and position of work.
K - Motor Coordination	Needed for dexterity and accuracy required to sustain working speed when conveying blue lath nail from mouth to position for hammering through gypsum sheets to wood stud.
M - Manual Dexterity	Needed to work swiftly with tools, wires, nails to install lath sheets.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Aptitude	Mean	SD	Range	r
G - General Learning Ability	102.8	16.8	68-151	.309*
V - Verbal Aptitude	99.0	14.3	70-147	.371**
N - Numerical Aptitude	96.9	16.8	60-137	.180
S - Spatial Aptitude	111.1	16.7	68-150	.130
P - Form Perception	102.6	18.4	63-156	-.152
Q - Clerical Perception	98.0	13.1	66-136	.070
K - Motor Coordination	97.8	17.5	66-140	.032
F - Finger Dexterity	93.2	18.8	44-135	.093
M - Manual Dexterity	106.7	22.7	52-152	-.027

*Significant at the .05 level
**Significant at the .01 level

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X			X			X		X
Irrelevant									
Relatively High Mean	X"			X	X				X
Relatively Low Standard Dev.		X				X			
Significant Correlation With Criterion	X	X							
Aptitudes to be Considered for Trial Norms	G	V	N	S					M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of Aptitudes G, V, N, S, and M at trial cutting scores were able to differentiate between the 69% of the sample considered to be good workers and the 31% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about one-third of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about one-third of the sample. The phi coefficient was used as a basis for comparing trial norms. Norms of N-80, S-85, and M-75 provided optimum differentiation of the occupation of Lather (const.) 842.781-010. The validity of these norms is shown in Table 6 and is indicated by a phi coefficient of .37 (statistically significant at the .005 level).

TABLE 6

Concurrent Validity of Test Norms
N-80, S-85, and M-75

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	7	37	44
Poor Workers	11	9	20
Total	18	46	64

Phi coefficient = .37 Chi square (X^2_y) = 8.6

Significance level = $P/2 < .005$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study met the requirements for incorporating the occupation studied into OAP-37 which is shown in the 1970 edition of Section II of the Manual for the General Aptitude Test Battery. A phi coefficient of .23 is obtained with the OAP-37 norms of N-80, S-95, and M-85.

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings, only <u>one</u> box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

How often do you see this worker in a work situation?

☐ See him at work all the time.

☐ See him at work several times a day.

☐ See him at work several times a week.

☐ Seldom see him in work situation.

How long have you worked with him?

☐ Under one month.

☐ One to two months.

☐ Three to five months.

☐ Six months or more.

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐ 2. Capable of low work output. Can perform at a slow pace.

☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

☐ 4. Capable of high work output. Can perform at a fast pace.

☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☑ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and <u>only</u> these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

FACT SHEET

Job Title

Lather (const.) 842.781-010

Job Summary

Nails, wires, and welds wooden, metal, or rockboard lath to walls, ceilings, and partitions of buildings to provide supporting base for fireproofing material, plaster, tile, cement, stucco, brick veneer, or terrazzo.

Work Performed

Confers with foreman or reads blueprints to determine locations of walls, door and window jambs, light fixtures, heating and air-conditioning ducts, access panels, and other openings to be made in walls and ceilings, and to ascertain heights of ceilings in rooms.

Cuts hanger wires using nippers and fastens wires in pre-drilled holes in metal concrete slab forms by hand. Measures and marks distance of hanger wires from floor and evens each series of hanger wires tied in structural forms to establish ceiling line, using water level. Cuts ceiling channel iron to required length and holds channel at specified height while bending and twisting wires around channel in repeating cycle to fasten carrier to hanger wires. Hand ties, clips with pre-formed metal clips or welds furring channel and at right angle to ceiling channel and at specified intervals to form supporting base for lath sheets.

Measures and cuts metal lath sheets using shears or breaks gypsum lath sheets along scored liner. Installs lath sheets and furring channel using screwdriver, hammer, wires, and nails. Cuts ceiling and floor tracks following outlines for installations to be made in walls and ceilings using power saw, nippers or by bending and breaking track by hand. Fastens track to channel carrier with wire or arc or acetylene welds and using level or following chalk line to insure tracks are evenly positioned. Ties or welds ends of wall studs to ceiling and floor track to secure framework to walls and ties or welds stiffeners to studs to strengthen framework of wall. Nails specified lengths of lath sheets to wall studs to form base for application of plaster, cement, or acoustical materials to interior walls. Nails strips and other types of trim onto lath sheets to establish area and limits for plastering.

Nails backing wire around exterior framework of building and draws wire taut to provide base for waterproof paper. Nails waterproof paper sheets to studs in shingle fashion and nails wire mesh on top of backing paper. Secures exterior framework to studs with furring nails to provide supporting base for exterior coating.

Effectiveness of Norms

Only 69% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the S-375R norms, 80% would have been good workers. 31% of the non-test-selected workers used for this study were poor workers; if these workers had been test-selected with the S-375R norms, only 20% would have been poor workers.

Applicability of S-375R Norms

The aptitude test battery is applicable to jobs which include a majority of duties described above.

GPO 898.799