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# The construction and validation of a test of woodworking ability for elementary school boys

Thesis

CONSTRUCTION AND VALIDATION

OF A TEST OF WOODWORKING ABILITY

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BOSTON UNIVERSITY

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Thesis

THE CONSTRUCTION AND VALIDATION

OF A TEST OF

WOODWORKING ABILITY

FOR

ELEMENTARY

SCHOOL

BOYS


Submitted by

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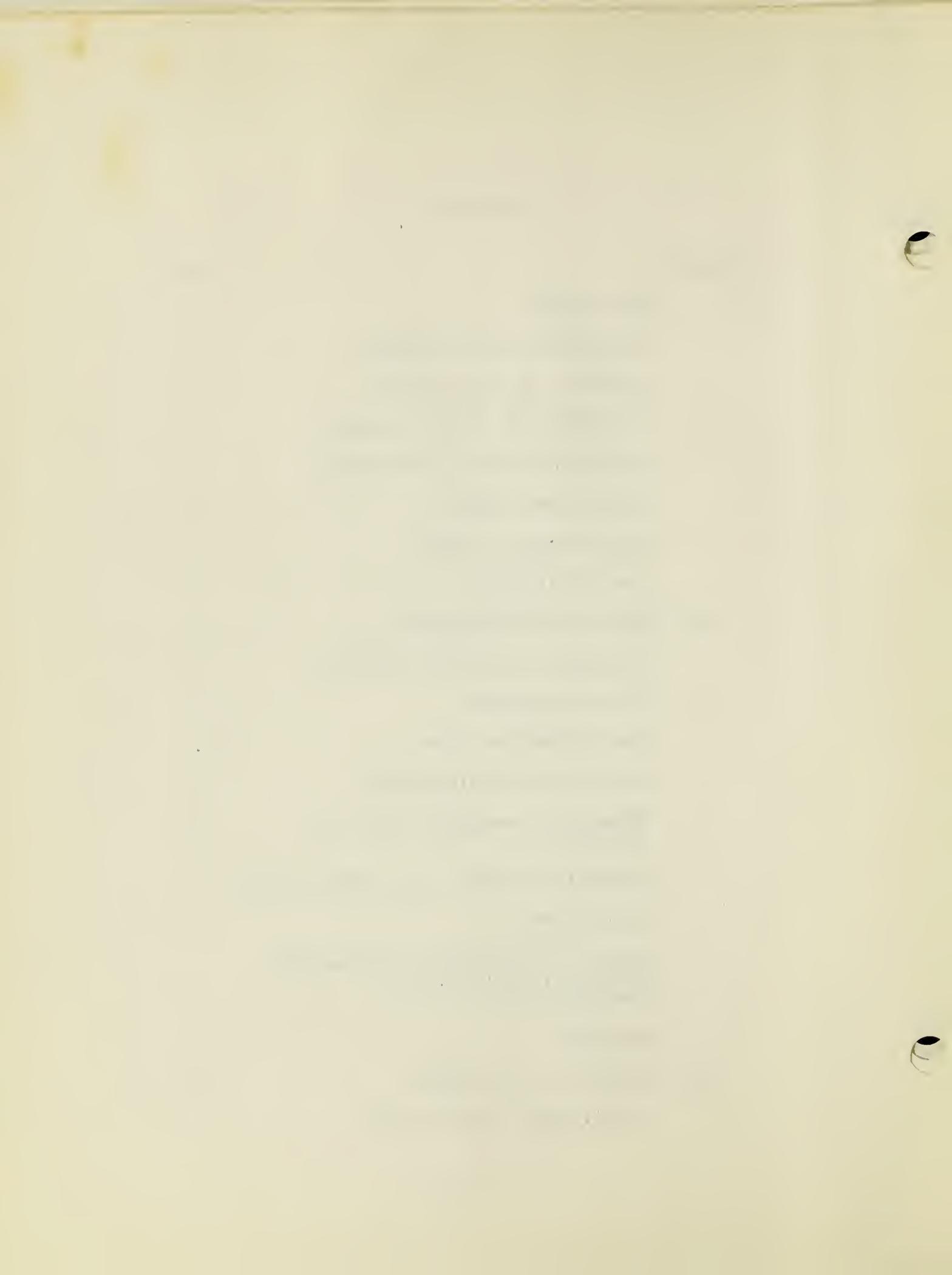Thesis approved:

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CHAPTER I

THE PROBLEM

Statement of the problem.  The purpose of this study
is to construct and validate a  paper and pencil group
test, which, when administered to boys at the elementary
school level, will/will not measure their ability to do
woodworking.  This test is essentially non-verbal, the
only language involved being in the administrative directions
for the test.  These directions were read to the groups
taking the test by the test administrators in an attempt
to minimize reading or language difficulties.

Analysis of the problem.  Strong[1] states that "there
are patterns of ability in a constellation of occupations."
Paterson[2], speaking more specifically of abilities of a
mechanical nature says that "an analysis of the organiza-
tion of mechanical ability indicates that ... it probably
does not involve any single general factor, (but that) low
intercorrelations between different measures of mechanical
ability suggest that factors of high specificity play a
major role."

[1]Strong, Edward L.  "Measurement and Diagnosis in a Program
of Guidance," Occupations, Vol. 12, March 1934, p. 70

[2]Paterson, Donald G. et al Minnesota Mechanical Ability
Tests, University of Minnesota Press, Minneapolis, 1930, p.43

Harrell[1] found five factors in a factorial analysis of four mechanical ability tests.  These factors were termed perceptual, verbal, youth, manual agility, and spatial.

Shutterly[2] points out that "since the factors to be measured are assumed to be different from general intelligence, the aptitude tests should correlate low with intelligence."  This is so reported in most studies of this relationship.

Bingham [3] reports that scores on a mechanical ability test correspond only roughly with the teacher's ratings of mechanical ability, but reports a coefficient of correlation of + .81 between the test results and the rating of a piece of mechanical work by competent judges.  Paterson[4] too, discarded ranking by teachers as unreliable, and used rating of projects as a means of validation, being careful that the projects were typical of the work of a course.

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[1]Harrell, William "A Factorial Analysis of Mechanical Ability Tests", Psychometrika, Vol. 5, March 1940, p.32

[2]Shutterly, Virginia "Is the Aptitude Test a Panacea", Occupations, Vol. 22, January 1944, p. 260

[3]Bingham, Walter V. "MacQuarrie Test for Mechanical Ability", Occupations, Vol. 14, December 1935, p. 202

[4]Op. cit., p. 58

Another fact discovered in this Minnesota study was that there is little relationship between general environment and mechanical ability.

Delimitation of the problem. The test constructed by the writer, referred to in this study as the Test of Woodworking Ability, was given to practically all of the boys in the eleven fifth and sixth grades of the public elementary schools of a local suburban town. Because a few boys were absent on the day that the tests were given in the various schools, the sample was not complete. Other cases were dropped from the study because of the incompleteness of the data available for them. The number of cases so dropped or lost because of absence numbered twenty-one. The number of cases included in the study is 252.

Justification of the problem. Examination of existing measures of mechanical aptitude, ability, and comprehension revealed that such measures have been particularly designed to measure at the secondary school and adult levels. It is a well known fact that most tests measure poorly at the extremes of their ranges. Therefore, a test meant to measure abilities of a mechanical nature at the age of ten or twelve years would best be a test designed and built to measure at that level.

Russell[1] lists the "continued study of the vocational implications of various mechanical abilities" as a need

in the area of specific abilities and disabilities.  Shop
teachers, too, recognize the need for further investigation
of this problem.  Newkirk and Greene[2] state that "indus-
trial education teachers and supervisors need reliable
measuring instruments in order to give more adequate
educational guidance" and that "aptitude or prognostic
tests in industrial education should be most useful in
determining the probability of success of a student in
such subjects".  These same authors point out the fact
that "it does not seem likely that a scientific method of
instruction can be devised ... without suitable measures
of achievement and abilities".

In line with these stated needs, an attempt was made
in this study to construct a test of woodworking ability
for boys of an elementary school age.  If variabilities in
ability to do shop work do exist at this age, they can and
should be measured.  Such measures should be added to other
criteria to help give a picture of the whole child at this age.

Assumptions made.  In this study the following
assumptions were made:

[1]Russell, D. H. "Trends and Needs in the Study of
Specific Abilities and Disabilities", Teachers College
Record, Vol. 42, December 1940, p. 249

[2]Newkirk, Louis V. and Harry A. Greene Tests and
Measurements in Industrial Education, John Wiley & Sons,
Inc., New York, 1935, pp. 1, 15, 29

1.  That differences in ability to do woodworking exist.

2.  That these differences can be measured in boys aged
approximately ten to twelve years.

3.  That the criterion score used in this study is suit-
able for purposes of validation.

4.  That the administrative directions for the Test of
Woodworking Ability are sufficiently objective to allow
for administration of the test by classroom teachers, school
principals, and guidance personnel.

5.  That the results obtained, using a sample biased in
intelligence, may be applied to a randomly selected sample.

6.  That the results obtained, using a group which has
had some common experience in woodworking, may be applied
to groups without such experience.

7.  That a coefficient of correlation between the test and
the criterion scores of $\pm$ .50 or better would indicate a
satisfactory level of prediction for an unrevised test of
this nature.

8.  That a coefficient of reliability of $\pm$.90 or better
would indicate a satisfactory level of reliability for an
unrevised test of this nature.

Definition of terms.  According to Kitson[1] the word
"aptitude should be used to designate the readiness with
which an untrained person acquires a given skill".

Bingham[2] puts it briefly this way. "Aptitudes indicate potentialities."

In contrasting aptitudes and abilities, Kitson[3] says, " 'Ability' should be used to designate a specific skill which has been acquired through training or experience." Paterson[4] defines ability of a mechanical nature as "that which enables a person to work with tools and machines, and the materials of the physical world ... to perform creditably or to turn out an acceptable product." The term "ability" is used in this sense in this study. If the writer's test successfully measures woodworking ability, its possibilities as a measure of aptitude might be investigated.

The dictionary definition of "criterion" as a standard with which anything is compared in forming a judgment of that thing, gives the sense in which that term is used in this study.

[1] Kitson, Harry Dexter "Aptitude Testing, its Contribution to Vocational Guidance", _Occupations_, Vol. 12, April 1934, p. 60

[2] Bingham, Walter V. "Vocational Bents", _Occupations_, Vol. 15, October 1936, p. 19

[3] Loc. cit.

[4] Op. cit, p.37

Recapitulation. As was previously stated, the purpose of this study is to construct and validate a paper and pencil group test, which, when administered to boys at the elementary school level, will/will not measure their ability to do woodworking.

# CHAPTER II

## REVIEW OF THE LITERATURE

The results of a survey of recent research indicate that further study in the area of mechanical aptitudes and abilities is definitely desirable. A summary of the literature concerned with aptitude and ability testing follows.

Aptitude and ability testing. In his volume entitled Aptitudes and Aptitude Testing,[1] Bingham indicates that the purpose of aptitude testing is to "measure selected samples of a person's behavior, and then, by reference to the facts as to what others who have been tested have done, compute the probabilities that he, too, will behave in a certain manner." The idea was kept in mind during this study that the test which would be constructed might, with a firm foundation as a measure of abilities necessary to success in woodworking, find a place in the field of prognostic tests. This idea was supported by a statement by Bingham[2] to the effect that "paper and pencil tests of mechanical aptitude ... find a

[1] Op. cit., p. 22
[2] Ibid., p. 135

place in the testing program, particularly when groups
are being examined for purposes of preliminary appraisal."
Hull[1] lists the advantages of the paper and pencil type
of test as; 1, it makes possible the testing of a large
group; 2, it is economical in cost; 3, it is economical
of time; 4, there is less time involved in scoring; 5, the
test itself and its scoring is objective. He (Hull[2]) also
states that "the variety of capacities possible to
sample in this way is far greater than is generally
supposed.... These possibilities have been very little
explored." This study attempts to explore this area
further.

The basis for the construction of the writer's test
will be further explained in Chapter III. Suffice it to
say now that the test constructed was intended to come
in the category of performance tests, in which the com-
prehension of the necessary administrative directions was
not intended to constitute a problem, nor the responses
to the test items involve verbal elements.

An attempt was made in the administrative directions

[1]Hull, Clark L. Aptitude Testing, World Book Co.,
Yonkers, 1928, p. 308

[2]Ibid., p. 302

to control certain variables which have an effect on the reliability of most tests. These six procedures were suggested by Newkirk and Greene[1]:

    1. The subjects' desks should be clear, pencils ready, and the administrator should have extra, sharp pencils available.

    2. The room should be quiet and all subjects paying attention.

    3. Test booklets should be passed, face up, by the administrator.

    4. The directions should be read by the administrator in careful tones.

    5. The administrator and subjects should follow directions strictly.

    6. Subjects should start and stop instantly on signal.

The trial group. Concerning the trial group to which a test in the process of construction is given, Hull[2] says that "the first consideration regarding the trial group is that the actual aptitudes of the individuals shall be susceptible of fairly accurate measurement."

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[1] Op. cit., p. 57

[2] Op. cit., pp. 341-342

This group should be made up of from one to several hundred cases. The trial group should be similar to the group for which the test is intended.

The criterion score. Bingham[1] states that "the validity of a test is the closeness of agreement between the scores and some other objective measure of that which the test is used to measure. This other measure is called the 'criterion'". Hull[2] goes on to say that "a satisfactory criterion score must be a numerical expression of the position that a more or less special-ized aspect of a subject's behavior takes on a linear scale. ... By far the most desirable criterion is some objective product resulting from the occupational activity of a subject." There are three methods by which the criterion may be scored. These are, in their order of merit, by means of an objective scale, by means of a subjective scale, and by means of school marks. The subjective scale is most frequently used in the validation of aptitude tests. The above facts were considered in the validation of the Test of Woodworking Ability.

[1] Op. cit., p. 214

[2] Op. cit., pp. 374-375

Validity and Reliability. Concerning validity,
Kitson[1] points out the fact that the correlation between
a test and a measure of proficiency should be .75 or
more. The test would then be considered a useful instru-
ment. However, he goes on to say that few aptitude
tests on the market meet this requirement. In Kitson's
opinion, the reliability of a test of this nature should
be around .95, but he again agrees that few tests approach
this level of reliability. In fact, some test builders
don't even bother to compute a measure of the reliabil-
ity of their tests. Bingham[2] offers, in explanation of
the low correlation between aptitude tests and measures
of proficiency (usually less than .50) the thought that
this low correlation is due not only to inadequate tests,
but also to the difficulty of developing proper criterion
measures. The four points listed by Bingham[3] as means
of improving the validity coefficient were considered in
this study. These factors are:

1. Improving the criterion measure.

2. Carefully choosing the traits to be measured.

3. Carefully developing tests to measure those traits.

4. Properly weighting the tests.

[1]Op. cit., pp. 62-63

[2]Op. cit., p. 214

[3]Ibid., p. 218

Effects of separate tests of a battery. In con-
sidering the effect of the separate tests of a battery
on the test as a whole one may again refer to Hull[1],
who explains that "the contribution of a test to the
forecasting efficiency of a battery is dependent jointly
upon the nature and extent of the relationship between
the test and the criterion on the one hand, and upon
the nature and extent of the relationship among the tests
themselves, on the other." The correlations between
tests should be as small as possible, that between the
test and the criterion as large as possible.

Mechanical ability and intelligence. Investigating
the relationship between mechanical ability and intel-
ligence, one finds some differences among the reports.
Newkirk and Greene[2] report the correlation running from
.20 to .30. Hollingworth[3] reports a correlation of .40
as being ordinarily obtained. Stenquist[4] found the
correlation to range from .20 to .40.

[1]Op. cit., p. 421

[2]Op. cit., pp. 27-28

[3]Hollingworth, Leta S. Special Talents and Defects,
The Macmillan Co., New York, 1923, p. 190

[4]Stenquist, John L. "Measurement of Mechanical Ability",
Contributions to Education, Teachers College, Columbia
University, No. 130, 1923, p. 69

Kefauver[1] sums it all up, however, with the conclusion that "it is obvious that characteristics measured by ... mechanical tests are different from those measured by mental tests."

Conclusion. One need only survey the literature in the area of mechanical aptitudes and abilities to agree with Traxler[2] that "we need more information concerning validation as indicated by correlations between test scores and criteria of success on the job."

Tests in the field of mechanical aptitude, ability, and comprehension. The survey of the literature concerned with mechanical aptitude and ability included an analysis of the various paper and pencil tests which measure these traits. Very brief summaries of these analyses follow.

The Detroit Mechanical Aptitudes Examination[3] was first published in 1928, and revised in 1939. The norms for the test are based upon results obtained from the administration of the test to eighth and ninth grade boys

[1]Kefauver, Grayson N. "Relationship of the Intelligence Quotient and Scores on Mechanical Tests with Success in Industrial Subjects", Vocational Guidance Magazine, Vol. 7, February 1929, p. 198

[2]Traxler, Arthur E. "Correlations Between 'Mechanical Aptitude' Scores and 'Mechanical Comprehension' Scores," Occupations, Vol. 22, October 1943, p. 43

[3]Baker, Harry J. et al. Detroit Mechanical Aptitudes Examination, Public School Publishing Co., Bloomington, Illinois, 1939

and girls. The coefficient of reliability reported for
the complete test is .90; those for the individual tests
run from .57 to .88. As indications of validity, a
correlation of .64 between the old and new tests, and a
correlation of .64 between scores on the earlier test
and shop grades are reported. The correlation between
scores on the test and a measure of intelligence was
found to be .65.

Bennett's Test of Mechanical Comprehension[1] was
"designed to measure the capacity of individuals to
understand various types of physical relationships."
The scores on the test are meant to be interpreted in
relation to the norms for any particular group. The
statement is made that the "direct evidence of validity
is meagre." Correlations of .5 with average grades in
military courses and from .3 to .6 with success in en-
gineering type occupations are reported. The test
correlates from .51 to .69 with other mechanical aptitude
tests, and from .25 to .43 with measures of intelligence.
The coefficient of reliability, using the Spearman-Brown
formula, is reported as .84.

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[1]Bennett, George K. and Dinah E. Fry Test of Mechanical
Comprehension, The Psychological Corp., New York, 1940

The MacQuarrie Test for Mechanical Ability[1] is designed for the "objective measurement of the aptitudes which underlie successful performance of a wide variety of jobs of a mechanical nature." The correlations between the test and Stenquist's Series I and II are .23 and .34 respectively. Correlations between the test and mechanical subjects range from .32 to .81. That between group mental tests and the Test for Mechanical Ability do not run above .20.

"The Mellenbruch Mechanical Aptitude Test for Men and Women[2] was undertaken to meet, if possible, the very definite need of industry to quickly determine the mechanical aptitude of applicants for mechanical positions." The test has two forms, which correlate .87 with each other. Indications of validity offerred are correlations of .59 with teachers' ranks of engineering drawing and .60 with the "mechanical activities" of the general public. Correlations with intelligence were found to range from .17 to .33.

[1] MacQuarrie, T. W. MacQuarrie Test for Mechanical Ability, California Test Bureau, Los Angeles, 1925

[2] Mellenbruch, Parl A. Mellenbruch Mechanical Aptitude Test for Mean and Women, Science Research Associates, Chicago, 1944

O'Rourke[1] in reporting data on his test says:

Correlations reported between test scores
and shop ratings by different investigators
vary considerably.  The more valid the
criterion and the wider the range of ability
of those tested, the higher are the correlations
secured.  Correlations reported between
test scores and ratings in vocational training
courses are as high as .84; between test
scores and ratings as machinist apprentices
.64; between test scores and ratings in school
vocational classes .83.

Stenquist[2] designed his tests as a "measure of
general mechanical aptitude" to be used as a "guide in
advising pupils in the choice of courses, especially
courses that involve choice of vocations."  He reports
correlations with shop and science teachers' rank for
"general mechanical aptitude" as ranging from .67 to .84.
His tests I and II have correlations ranging from .66
to .85 with his Assembling Test.  A correlation of .21
is reported as the relationship between these mechanical
aptitude tests and intelligence.

Summary.  From the review of the research reported
in this chapter there is definite evidence that:

[1]O'Rourke, L. J. O'Rourke Mechanical Aptitude
Test, Psychological Institute, Washington, D.C., 1939

[2]Stenquist, John L. Stenquist Mechanical Aptitude
Tests, Series I and Series II, World Book Co.,
Yonkers, N.Y., 1922

1.  The trial group to which a test is administered should consist of from one to several hundred cases.  This group should be similar to the group for which the test is intended.

2.  The criterion score should be an objective measure of the actual product of one's abilities.

3.  The tests of a battery should have a low correlation with each other and a correlation as high as possible with the criterion score.

4.  Tests of mechanical aptitude and ability show a low positive correlation with intelligence.

5.  Few aptitude tests approach the desired level of validity (.75) or reliability (.95) for tests of this nature.

6.  There is a need for more information regarding tests in the field of mechanical aptitude and ability.

7.  The possibilities of the paper and pencil performance type tests of mechanical aptitude and ability have not been fully explored.

With these facts in mind, the writer attempted to design a test which, when administered to boys at the elementary school level, would/would not measure their ability to do woodworking.

# CHAPTER III

## PROCEDURE OF THE STUDY

Construction of the test.  Hanna[1] gives the
following four steps for the construction of an aptitude
test battery:

> In the first place, the working situation
> itself must be accurately analyzed.  In
> the second place, the work functions must
> be accurately and adequately translated
> into human abilities. ... As a third step,
> the technique for the discovery and
> measurement of these essential human
> qualities must be sufficiently inclusive
> and reliable.  A fourth necessity (would
> be) standards for the administration of
> the test technique, and especially for
> the interpretation of (the) test results.

Hull[2] lists the steps in the construction of an aptitude
test battery as follows:

> 1.  Psychological analysis of the vocation.
>
> 2.  Choice of preliminary battery of tests.
>
> 3.  Administration of preliminary battery
> to a group whose actual abilities may be
> measured.

[1]Hanna, J. V. "Standards Needed in the Testing
of Aptitudes," Vocational Guidance Magazine,
Vol. 7, March 1929, p. 258

[2]Hull, Clark L. "Aptitude Test Batteries,
Procedures in Their Construction," Occupations,
Vol. 12, April 1934, pp. 65-66

4. Determination of actual aptitude of individuals in the trial group.

5. Comparison of test scores with actual abilities of the subjects.

An attempt was made to follow the procedures outlined by these two authors in the construction of the test involved in this study.

In his volume, Aptitudes and Aptitude Testing,[1] Bingham says that a measure of the range of a person's familiarity with tools and their uses offers a sample of that person's stock of information concerning things mechanical. "A youth with a strong bent for things mechanical will have seized upon and profited by opportunities which one without such aptitudes would tend to ignore." In the same volume he (Bingham[2]) states that "tests to measure familiarity with the uses of a large number of pictured tools and of ability to identify the objects and materials with which these tools are used, yield scores significantly related to other measures of mechanical aptitude."

[1] Bingham, Walter Van Dyke Aptitudes and Aptitude Testing, Harper & Brothers, New York, 1937, pp. 318-319

[2] Op. cit., p. 137

It was on this basis that sub tests I, II, and III
of the writer's test, which are later referred to as
Tests of Tool Knowledge, A, B, and C, were constructed.
Test I consists of pictures of woodworking tools to be
matched with pictures of materials with which those tools
are ordinarily used.  Test II matches pictures of tools
with pictures of component parts of those tools.  Test
III consists of pairs of pictures of tools which have
similar purposes or uses.

Bingham[1] gives the following factors as being among
the important facets of activities of the nature of
bench work:  Steadiness of voluntary hand movements,
kinesthetic sensitivity, delicacy of touch, strength of
grasp, and ability quickly to adopt a rapid easy
rhythm of movement.  These factors seem logically to
be part and parcel of ability to do woodworking.

With these listed factors in mind, sub tests IV,
V, and VI of the Test of Woodworking Ability were designed
to measure phases of motor ability.  These three sub
tests are tentatively titled Hand Steadiness Test,
Manual Dexterity Test, and Finger Dexterity Test.  The
first of these consists of an irregularly curved line,

[1] Op. cit., pp. 122-123

to be traced by the subject. The second consists of
irregularly spaced "gates" through which the subject
traces a line with a pencil. The last of this group
of sub tests consists of a series of paired circles,
decreasing in size, within which the subject attempts
to mark crosses which touch or cross the interior circle,
but do not touch the exterior circle.

Harrell, as reported by Segel in the Review of
Educational Research[1] for February 1941, found perceptual
and spatial factors as two of five items in "A Factor
Analysis of Mechanical Ability Tests.[2]" Also reported
in that same volume of the Review[3] is a study conducted
by Slater[4] in which he found that valid tests of mech-
anical aptitude were "saturated" with spatial relationships.

[1]Segel, D. "Measurement of Aptitudes in Specific
Fields," Review of Educational Research, Vol. 11,
February 1941, pp. 42-56

[2]Op. cit., p. 27

[3]Loc. cit.

[4]Slater, P. "Some Group Tests of Spatial Judgment
or Practical Ability," Occupational Psychology,
London, Vol. 14, January 1940, p.53

It was an obvious deduction from these studies and
an analysis of woodworking skills that spatial relations
should be the aspect of a third group of sub tests in
the writer's test battery.

Sub test VII, in which the subject selects a
pattern, made up of dots forming a regular geometric
figure, from a distractive background of dots, was
designed to measure aspects of spatial relations. It
is later referred to as the Spatial Relationships Test.
Sub test VIII, which depicts parts of a ruler on which
are indicated certain measurements to be picked off by
the subject being tested, is a Measurements Test. Sub
test IX is called the Estimation of Angles Test. In
this test the subject is to select an angle from among
a group of angles which is exactly like a given angle.
This test, too, involves spatial relationships.

Administration of the Test to a trial group. The
constructed test was given to a trial group of four pupils
by the writer, using the administrative directions for
the test. This group consisted of two boys who, in the
experienced opinion of the crafts teacher, were definitely
lacking in ability to do good handwork, and two who were
definitely capable in this type of work. Each boy was
given all the time necessary to complete each of the sub
tests and this time was noted. Any points at which the

administrative directions seemed to lack clarity were
also noted, and an attempt made to improve them.

From the time taken by these boys to finish each
of the sub tests, the time allowed for each test was
determined.  An attempt was made to allow sufficient
time for most pupils to finish tests I, II, III, VII,
VIII, and IX, and the time allowed for tests IV, V, and
VI was such as to allow only the most rapid pupils to
actually finish each of these tests.

Administration of the test.  The Test of Woodworking
Ability was administered to all of the boys in the fifth
and sixth grades in the public elementary schools of a
local suburban town, with the exception of the few boys
who were absent on the day that the test was given.  A
few cases were dropped from the study because of the
incompleteness of the data available for those cases.
The number of cases so dropped or lost because of absences
numbered twenty-one.

The tests were administered by the school principals,
grade teachers, and by guidance personnel after they had
had an interview with the writer to give him an opportunity
to explain the test and its directions.  The various
administrators of the test also had ample opportunity to
study the test and the directions before giving the test.

The conditions outlined in the administrative directions were, insofar as possible, maintained in each room during the giving of the test.

It is important to note that every pupil was asked to finish sub tests I, II, III, VII, VIII, and IX, using a colored pencil or pen and ink in contrast to lead pencil, after his time limits were up. This work was not considered as a part of his score, but was done for the purpose of making an item analysis for those sub tests possible.

Scoring the test. The scoring keys included in the appendix of this study were used for the scoring of the various sub tests of the Test of Woodworking Ability.

The items in tests I, II, III, VII, VIII and IX are marked correct or incorrect as they match or do not match the proper responses indicated on the scoring keys.

The key for test IV consists of a copy of the test on oak tag with holes punched at random intervals along the line included in the test. A point is scored each time the line drawn by the pupil coincides sufficiently well with the line on the test, so that no space shows between the two lines within the area of any punched hole.

The key for test V consists of a copy of the test on oak tag, punched so as to allow for scoring of 61 of the 97 "gates". These 61 points were randomly selected.

A point is scored each time the line drawn by the pupil passes through a "gate" visible through the key without touching either side of the "gate".

The key for test VI consists of a copy of the test on oak tag punched with holes which allow 45 of the 175 possible responses, randomly selected, to be scored. The response visible through each of these holes is scored a correct response if the cross is made within the inner circle in such a manner that all four arms of the cross touch or pass through the inner circle, but do not touch the outer circle.

The criterion score. The criterion score, against which the results of the Test of Woodworking Ability are validated in this study, is the arithmetical total of three scores. The first of these is the mark assigned to each pupil by the crafts teacher for that pupil's work during the year in the crafts course. The crafts course consisted of one week's work with finger painting, four weeks of cardboard construction, six weeks of raffia work, five weeks of gimp work, five weeks of mechanical drawing and eleven weeks of woodwork.

The second score included in the total is the mark assigned to each pupil by the crafts teacher for that pupil's woodworking project, the pupil's choice of one

of three possible projects, completed during the latter
part of the crafts course. Both of these marks were
converted to numerical scores within the range one to
nine, such that the better the mark, the lower was the
numerical score.

The third score was a score assigned to each pupil
by the writer on the basis of his interpretation of the
quality of the woodworking project completed by each
pupil. These scores again ranged from one to nine, such
that the better the quality of the project, the lower
was the score.

Statistical treatment of the test data. Upon
completion of the scoring of the test, a frequency dis-
tribution of scores for each of the sub tests was made.
The class interval chosen for each distribution was such
that the resultant classes numbered from ten to twenty-
one, depending upon the range of scores found. From these
distributions the mean, standard deviation, and the
standard error of the mean were calculated.

Garrett[1] indicates that the normal curve of dis-
tribution is bilaterally symmetrical about the mean, and

[1]Garrett, Henry E. Statistics in Psychology and
Education, Longmans, Green and Co., New York,
1940, pp. 112-113

that 99.73% of the entire distribution falls within the limits ±3SD. Taking these as criteria each curve of distribution in this study was examined to determine its relative normality.[1] Positive or negative skewness and kurtosis, "peakedness" or flatness, of the various distributions were also determined as found necessary.[2]

Scatter diagrams, pairing scores of all possible combinations of sub tests, indicated that the coefficient of correlation between each pair might be calculated by the product-moment method. This was so done and the probable error for each coefficient of correlation computed. The formulas used were:

$$r = \frac{\frac{\leq x^1 y^1}{N} - C_x C_y}{\sigma_x \sigma_y}$$

$$PE_r = \frac{.6745 \ (1-r^2)}{\sqrt{N}}$$

Scatter diagrams were similarly constructed and the coefficient of correlation between the scores on each sub test and the criterion score similarly figured. These coefficients, multiplied by a constant, ten, were used as the weighting factors, by which the standard scores for the various sub tests were multiplied. Weighting scores in relation to a coefficient of correlation is

[1] $x^2 = \frac{(f_o - f)^2}{f}$

[2] $Sk = \frac{3(M-Mdn)}{\sigma}$ , $Ku = \frac{Q}{(P_{90} - P_{10})}$

suggested in Peatman's <u>Descriptive and Sampling</u>
<u>Statistics.</u>[1]

The critical ratios for all the items in the sub
tests which lend themselves to such statistical treatment
(I, II, III, VII, VIII, and IX) were calculated, using
the following formulas from Edgerton's tables[2]:

$$\sigma p = \sqrt{\frac{pq}{N}}$$

in which p equals the percentage, q equals the difference
between p and 1.00, and N equals the number of cases

$$\sigma \text{diff.} = \sqrt{\sigma p_1{}^2 + \sigma p_2{}^2}$$

$$C.R. = \frac{\text{diff. of } \%}{\text{diff.}}$$

[1] Peatman, John Gray <u>Descriptive and Sampling</u>
<u>Statistics</u>, Harper & Brothers Publishers, New
York, 1947, pp. 484-485

[2] Edgerton, Harold Asahel, and Paterson, Donald G.
"Table of Standard Errors and Probable Errors of
Percentages for Varying Numbers of Cases,"
<u>Journal of Applied Psychology,</u> Vol. 10, September
1926

The 1% level of significance (CR = 2.576) was chosen as the level of acceptance/rejection for the items. According to Mills[1], this level is one of statistical significance.

The index of ease of each of these same items was found by the method indicated by Guilford in his Fundamentals of Statistics in Psychology and Education,[2] using the formula:

$$P = \frac{Pu + Pl}{2}$$

in which Pu is the percent of the upper quarter getting the item correct, and Pl is the percent of the lower quarter getting the item correct. The higher the index of ease resulting, the easier is the item.

The raw scores for each sub test were converted to standard scores, using the formula

[1]Mills, Frederick Cecil Statistical Methods Applied to Economics and Business, Henry Holt and Company, New York, 1938, p. 471

[2]Guilford, Joy Paul Fundamental Statistics in Psychology and Education, McGraw-Hill Book Company, Inc., New York, 1942, pp. 292-293

$$z = \frac{x - M}{SD} + 5$$

in which x is the raw score, M the mean and SD the
standard deviation of the distribution of raw scores.

These standard scores were then multiplied by the
weighting factor, and the results rounded to the nearest
whole number or .5. The rounded, weighted scores made
by each pupil on the nine sub tests were then added to
give the total test score for that pupil.

Distributions of the intelligence quotients of the
252 pupils in the study, as measured by the Stanford
Revision of the Binet-Simon Intelligence Scales, and
their criterion scores and total test scores were made,
and the mean, standard deviation, and standard error of
the mean of each distribution computed. The resultant
curves were compared with the normal probability curve
in the manner indicated previously.

Intercorrelations among the Binet intelligence
quotients, the criterion scores, and the total test
scores were run, and the probable error of each correlation
computed. To eliminate the effect of intelligence on
the coefficient of correlation between the total test
scores and the criterion scores, this factor was
partialled out, using this formula from Garrett:[1]

$$r_{12.3} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{1 - r^2_{13}} \sqrt{1 - r^2_{23}}}$$

The coefficient of alienation, interpreted as the predictive efficiency expressed as a percent showing to what extent any indication is better than a sheer guess, as presented by Peatman[2], was taken as the basis of interpretation of the significance of the correlation between the total test scores and the criterion scores, the validity coefficient for the test.

The Kuder-Richardson[3] "foot-rule" coefficient was the method used to obtain an estimate of the reliability of the test. The formula reads as follows:

$$r_{tt} = \frac{n}{n-1} \frac{\sigma t^2 - n \bar{p} \bar{q}}{\sigma t^2}$$

in which $\bar{p} = \frac{Mt}{n}$ and $\bar{q} = 1.00 - \bar{p}$, and where M is the mean and $\sigma t$ the standard deviation of the test scores, and n is the number of test items.

[1] Op. cit., p. 414

[2] Op. cit., pp. 451-454

[3] Kuder, G. F., and Richardson, M. W., "The Theory of the Estimation of Test Reliability, Psychometrika, Vol. 2, September 1937, pp. 151-160

# CHAPTER IV

## ANALYSIS OF THE DATA

**Distribution of scores on sub test I, Test of Woodworking Ability.** Figure 1 consists of a histogram which indicates the distribution of the scores made by 252 fifth and sixth grade boys in the public schools of a local suburban town on sub test I (Test of Knowledge of Tools, A) of the Test of Woodworking Ability. The mean, standard deviation, and the standard error of the mean of the distribution are also included.

An analysis of figure 1 indicates that the range of scores obtained on sub test I by the 252 pupils runs from a low of 1, to a high score of 16. Comparing this with the possible range of the test (0 to 20), one finds an indication that there is sufficient base and top to the range of possible test scores.

By inspection of the distribution, it is quite apparent that the scores obtained tend to distribute themselves symmetrically about the mean. By eye, the resultant curve approximates the normal curve of distribution. The fact that the extremes of the distribution fall at approximately $\pm$ 3 SD is another indication that the curve

33

approximates normality[1] (99.7% of a normal distribution
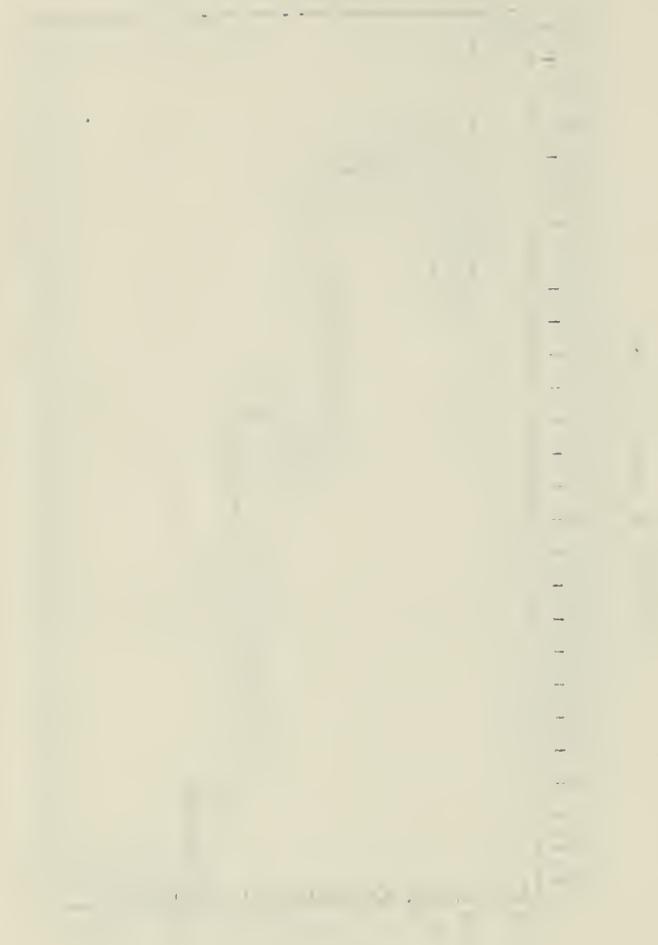is contained within ± 3 SD).



Mean           8.00
S.D.           2.93
S.E. Mean      .19

Figure 1

Distribution of Scores on Sub Test I,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

Distribution of scores on sub test II, Test of
Woodworking Ability.  Figure 2 consists of a histogram
which indicates the distribution of the scores made by
252 fifth and sixth grade boys in the public schools of
a local suburban town on sub test II (Test of Knowledge

[1] P= .859

of Tools, B) of the Test of Woodworking Ability. The
mean, standard deviation, and standard error of the mean
of the distribution are also included.



Mean        6.83
S.D.        3.04
S.E. Mean   .19

Figure 2

Distribution of Scores on Sub Test II,
Test of Woodworking Ability for 252 Cases
in Grades V and VI

An analysis of figure 2 indicates that the range of
scores obtained on sub test II by the 252 pupils runs from
a low of 0 to a high score of 14. Comparing this with the
possible range of the test (0 to 20) one finds that the

range of possible test scores is exhausted. There were four
pupils who scored 0 on this sub test. This indicates
that the test is more difficult than the first sub test,
even with the practice effect of that somewhat similar
previous test.

By inspection of the distribution, it is quite
apparent that the scores obtained tend to distribute them-
selves symmetrically about the mean. By eye, the resultant
curve approximates the normal curve of distribution, but
not quite as closely as do the results for sub test I.
The fact that the extremes of the distribution fall at
approximately ± 3 SD is another indication that the curve
approximates normality.[1]

Distribution of scores on sub test III, Test of
Woodworking Ability. Figure 3 consists of a histogram
which indicates the distribution of the scores made by
252 fifth and sixth grade boys in the public schools of
a local suburban town on sub test IV (Test of Knowledge
of Tools, C) of the Test of Woodworking Ability. The mean,
standard deviation, and the standard error of the mean of
the distribution are also included.

An analysis of figure 3 indicates that the range of
scores obtained on sub test III by the 252 pupils runs
from a low of 0 to a high score of 9. Comparing this with
the possible range of the test (0 to 10), one finds that

[1] P = .530

the base of the range of possible test scores is ex-
hausted.   There were 54 pupils who scored 0 on this sub
test.   This indicates that the test is the most difficult
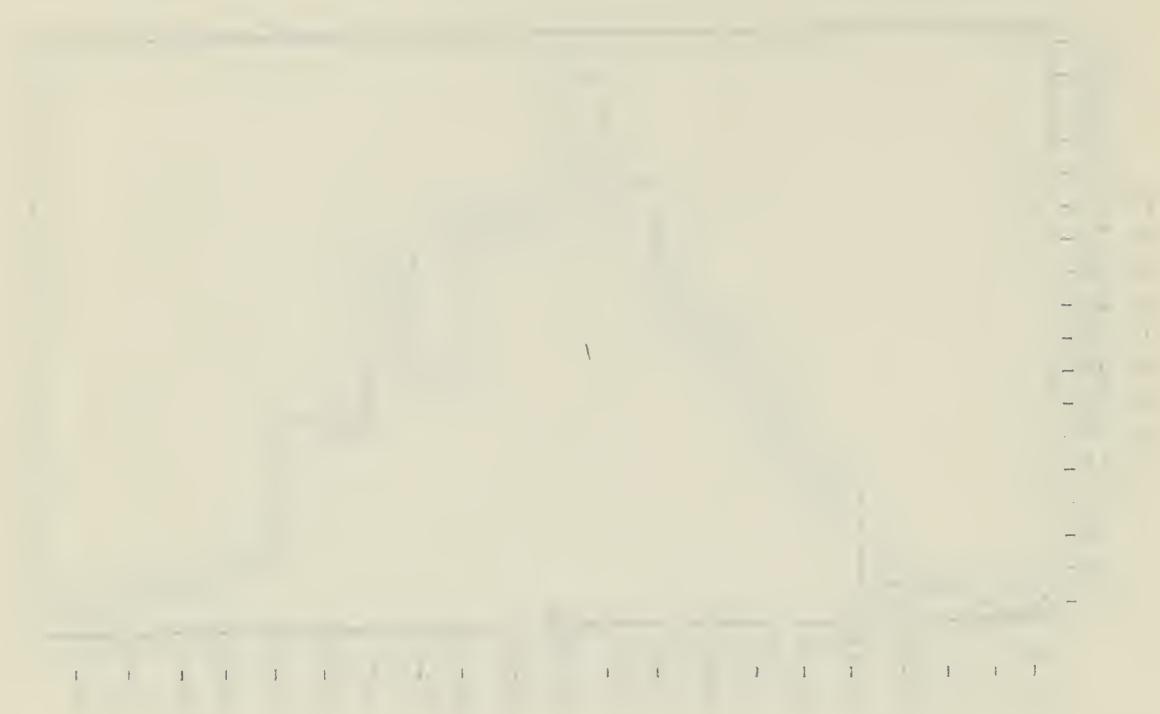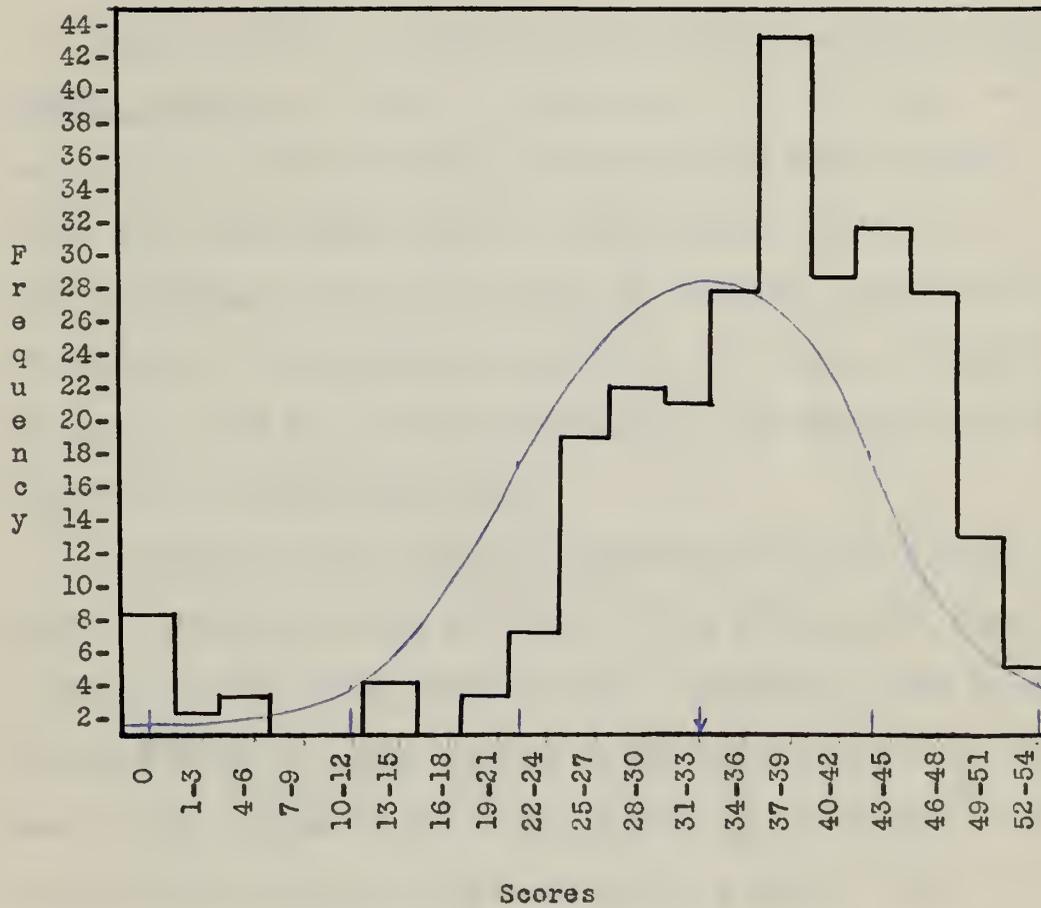of the series of tests of tool knowledge.



Scores

Mean          2.40
S.D.          1.42
S.E. Mean     .09

Figure 3

Distribution of Scores on Sub Test III,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

The resultant distribution deviates from the normal
curve of distribution, being slightly positively skewed and
slightly platykurtic.[1] The small number of items in this sub
test (10) probably contributes to the abnormality of the
curve secured.

Distribution of scores on sub test IV, Test of
Woodworking Ability. Figure 4 consists of a histogram
which indicates the distribution of the scores made by
252 fifth and sixth grade boys in the public schools of
a local suburban town on sub test IV (Hand Steadiness Test)
of the Test of Woodworking Ability. The mean, standard
deviation, and standard error of the mean of the dis-
tribution are also included.

An analysis of figure 4 indicates that the range of
scores obtained on sub test IV by the 252 pupils runs
from a low of 0 to a high score of 66. Comparing this
with the possible range of the test (0 to 72), one finds
that the base of the range of possible test scores is ex-
hausted. This is not too serious a fault, however, because
there is only one zero score and the zero score lies
slightly more than 3 SD's from the mean.

By inspection of the distribution, it is quite ap-
parent that the scores obtained tend to distribute them-
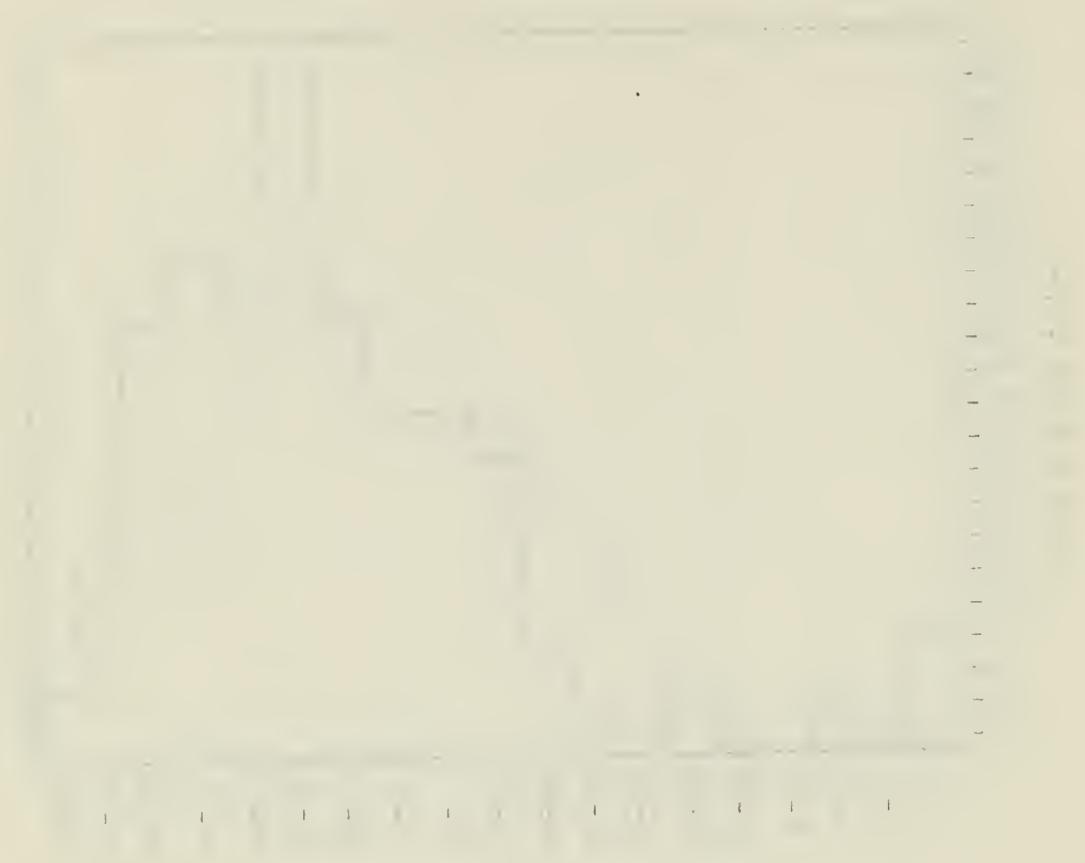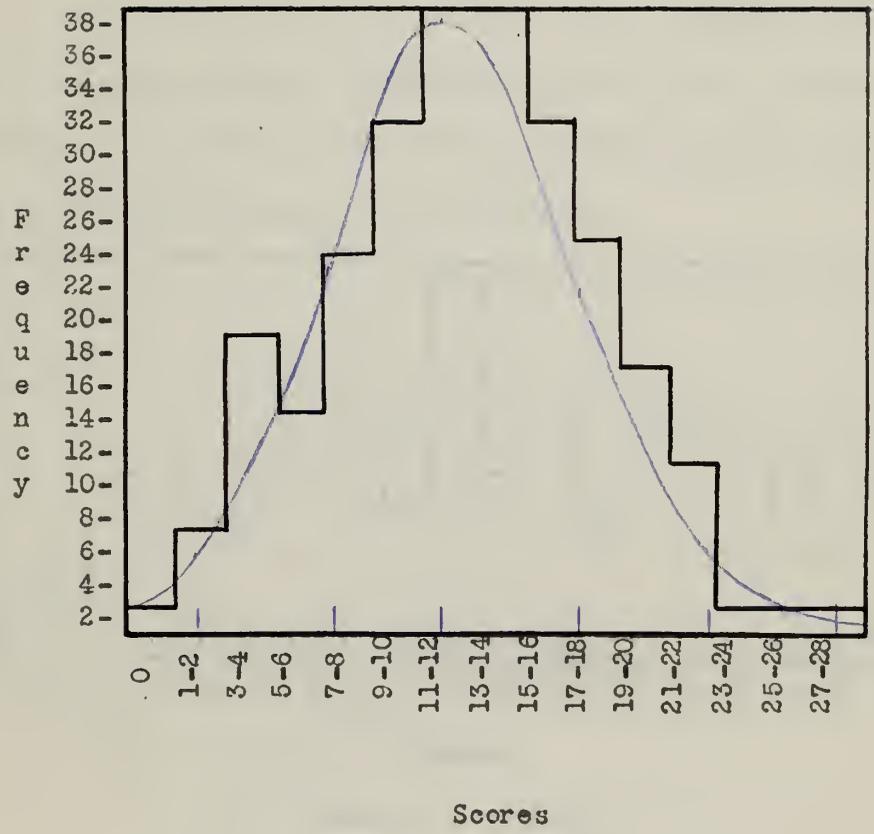selves symmetrically about the mean of the distribution.
By eye, the resultant curve approximates the normal curve

[1] P = .000 , Sk = +.380 , Ku = .287

Scores

| | |
|---|---|
| Mean | 34.79 |
| S.D. | 10.94 |
| S.E. Mean | .69 |

Figure 4

Distribution of Scores on Sub Test IV,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

of distribution.[1] The fact that the extremes of the dis-
tribution fall at approximately ± 3 SD is another indication
that the curve approximates normality.

Distribution of scores on sub test V, Test of Wood-
working Ability. Figure 5 consists of a histogram which
indicates the distribution of the scores made by 252
fifth and sixth grade boys in the public schools of a
local suburban town on sub test V (Manual Dexterity Test)
of the Test of Woodworking Ability. The mean, standard
deviation, and the standard error of the mean of the
distribution are also included.

An analysis of figure 5 indicates that the range of
scores obtained on sub test V by the 252 pupils runs from
a low of 0 to a high score of 54. A comparison of this
range with the possible range of the test (0 to 61)
would seem to indicate that the base of the range of
possible scores might be exhausted. However, although
there are seven 0 scores, there are only eight other scores
in the range of 1 to 21. Analysis of the copies of the
tests involved indicates that most of these pupils ob-
viously had difficulty in trying to follow the administra-
tive directions for this sub test.

By inspection of the distribution, it is quite apparent
that the scores obtained tend to distribute themselves
symmetrically about the mean of the distribution. However,

[1] P = .547

Scores

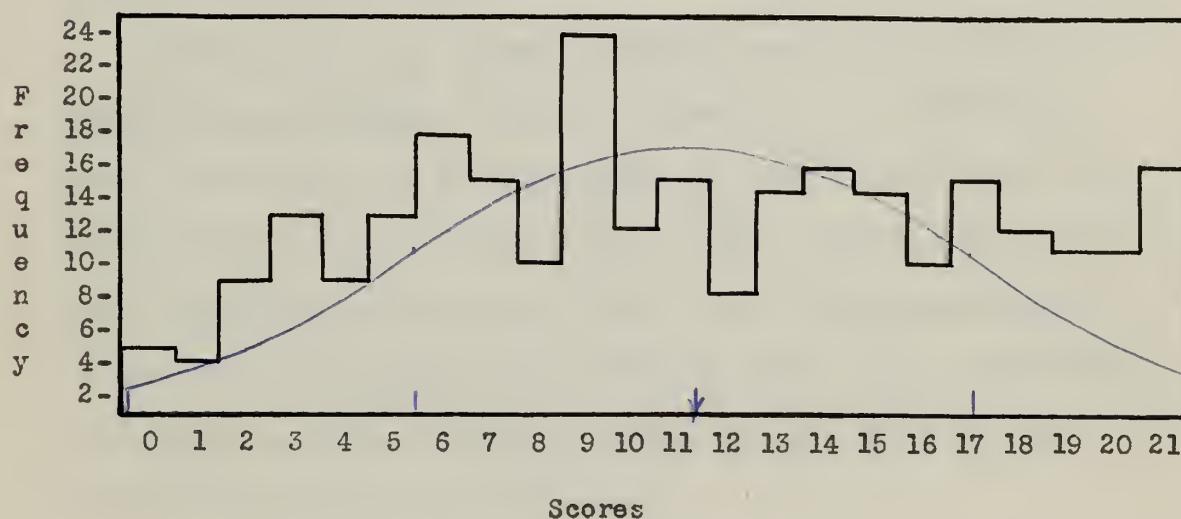| | |
|---|---|
| Mean | 31.39 |
| S.D. | 10.64 |
| S.E. Mean | .67 |

Figure 5

Distribution of Scores on Sub Test V,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

the resultant curve deviates significantly from the normal curve of distribution.[1]

Distribution of scores on sub test VI, Test of Woodworking Ability. Figure 6 consists of a histogram which indicates the distribution of the scores made by 252 fifth and sixth grade boys in the public schools of a local suburban town on sub test VI (Finger Dexterity Test) of the Test of Woodworking Ability. The mean, standard deviation, and the standard error of the mean of the dis - tribution are also included.

An analysis of figure 6 indicates that the range of scores obtained on sub test VI by the 252 pupils runs from a low of 0 to a high score of 28. Comparing this with the possible range of the test (0 to 45) one finds that the base of the range of possible scores is exhausted. This is not too serious a fault, however, because there is only one zero score.

By inspection of the distribution it is quite ap- parent that the scores obtained tend to distribute them- selves symmetrically about the mean of the distribution. By eye, the resultant curve approximates the normal curve of distribution.[2] The fact that the extremes of the dis- tribution fall at approximately ± 3SD is another indica- tion that the curve approximates normality.

[1] P = .000 , Sk = -1.813 , Ku = .283          [2] P = .153

Scores

| Mean | 11.83 |
|------|-------|
| S.D. | 5.22 |
| S.E. Mean | .33 |

Figure 6

Distribution of Scores on Sub Test VI,
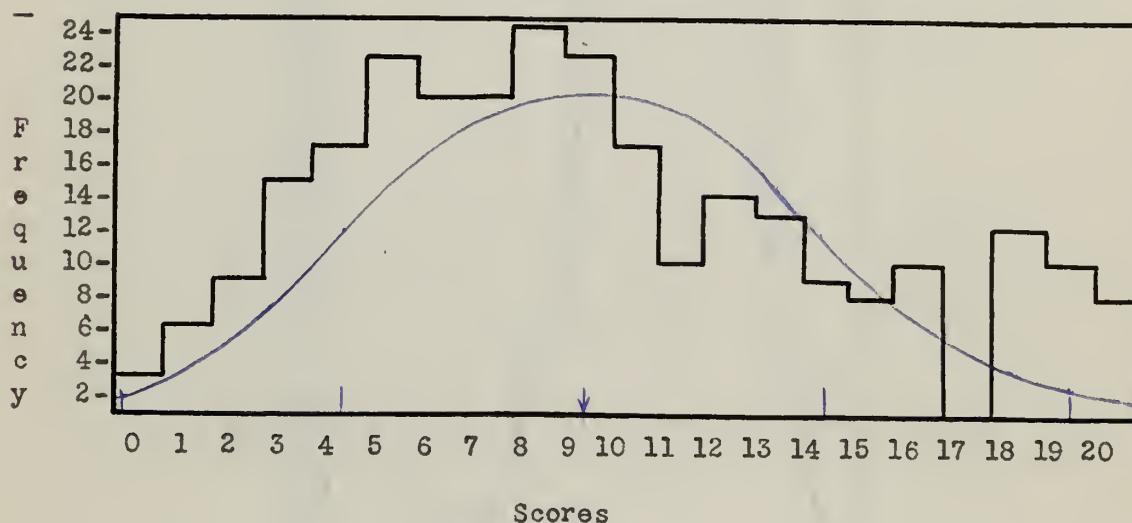Test of Woodworking Ability for 252 Cases
in Grades V and VI

<u>Distribution of scores on sub test VII, Test of</u>
<u>Woodworking Ability.</u>  Figure 7 consists of a histogram
which indicates the distribution of the scores made by
252 fifth and sixth grade boys in the public schools of a
local suburban town on sub test VII (Spatial Relationships
Test) of the Test of Woodworking Ability.  The mean,
standard deviation, and the standard error of the mean of
the distribution are also included.



Scores

| Mean | 11.26 |
|------|-------|
| S.D. | 5.77 |
| S.E. Mean | .36 |

Figure 7

Distribution of Scores on Sub Test VII,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

An analysis of figure 7 indicates that the range of
scores obtained on sub test VII by the 252 pupils runs
from a low of 0 (seven scores) to a high score of 21 (fifteen

scores), the extremes of the possible range.  The base
and the top of the possible range are both exhausted.

The resultant distribution deviates from the normal
curve of distribution, being very slightly positively
skewed and slightly platykurtic.[1] The extremes of the
distribution fall at approximately ±2SD.  It is evident
that this sub test must be drastically revised, or deleted
entirely from the test.

Distribution of scores on sub test VIII, Test of
Woodworking Ability.  Figure 8 consists of a histogram
which indicates the distribution of the scores made by
252 fifth and sixth grade boys in the public schools of a
local suburban town on sub test VIII (Measurement Test)
of the Test of Woodworking Ability.  The mean, standard
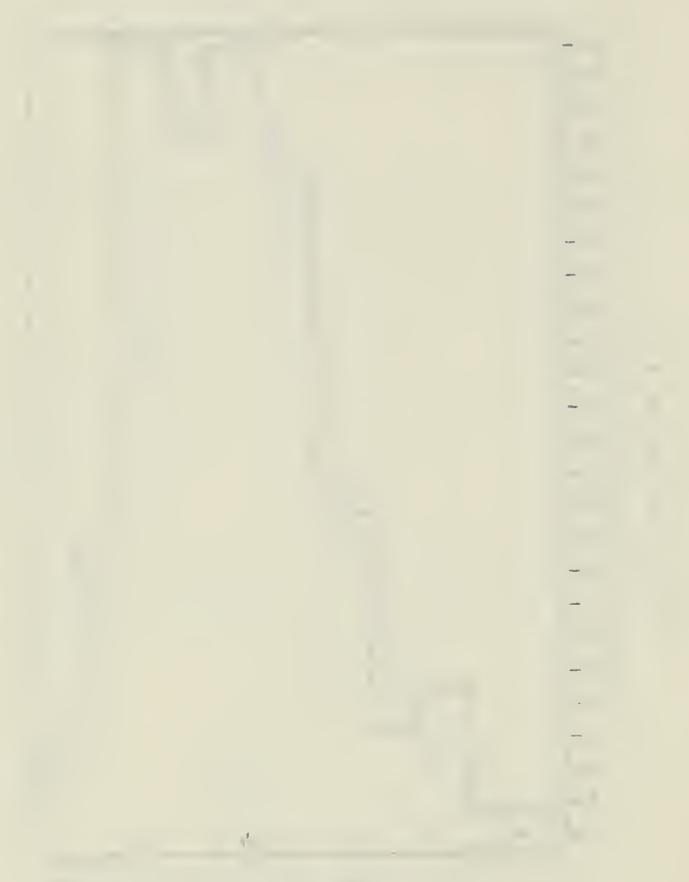deviation, and the standard error of the mean of the
distribution are also included.

An analysis of figure 8 indicates that the range of
scores obtained on sub test VIII by the 252 pupils runs
from a low of 0 to a high score of 20.  Thus the possible
range of the test (0 to 20) is exhausted, with two scores
at the lower and seven scores at the upper extreme of the
possible range.

By inspection of the distribution, it is apparent
that the scores obtained tend to distribute themselves sym-
metrically about the mean of the distribution.  However,

[1] P = .010 , Sk = +.244 , Ku = .300

the resultant curve is very slightly leptokurtic in nature, be-
ing more peaked than normal, and a significant positive skewness
is observed.[1] This is possibly an indication that the
sub test as a whole is rather difficult, but that there
is a need for a few more difficult items to bring the
higher scores in toward the mean.



Mean        9.19
S.D.        5.00
S.E. Mean    .32

Figure 8

Distribution of Scores on Sub Test VIII,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

Distribution of scores on sub test IX, Test of Wood-
working Ability. Figure 9 consists of a histogram which
indicates the distribution of the scores made by 252 fifth
and sixth grade boys in the public schools of a local

[1] P = .001 , Sk = +1.710 , Ku = .249

suburban town on sub test IX (Estimation of Angles Test)
of the Test of Woodworking Ability.  The mean, standard
deviation, and the standard error of the mean of the
distribution are also included.



| Mean | 6.21 |
|------|------|
| S.D. | 1.94 |
| S.E. Mean | .12 |

Figure 9

Distribution of Scores on Sub Test IX,
Test of Woodworking Ability, for 252 Cases
in Grades V and VI

An analysis of figure 9 indicates that the range of scores obtained on sub test IX by the 252 pupils runs from a low of 0 to a high score of 10. Thus the possible range of the test (0 to 10) is exhausted, with two scores at the lower and five scores at the upper extreme of the possible range. This is not surprising, however, with such a small number of items in the test.

The resultant distribution deviates from the normal curve of distribution, being very slightly negatively skewed and slightly platykurtic in nature.[1]

Intercorrelations among sub test scores, Test of Woodworking Ability. Table I indicates the correlation of each of the nine sub tests of the Test of Woodworking Ability, with each of the other eight sub tests. This data was computed from the results of the administration of the test to 252 boys in the fifth and sixth grades of the public schools of a local suburban town.

An analysis of Table I indicates that, of the thirty-six coefficients of correlation, thirteen indicate no correlation, sixteen are slight positive correlations, and only seven approach any significance whatsoever. These latter correlations are among sub tests I, II, and III;

[1] P = .010 , Sk = -.201 , Ku = .285

IV and VI; and VII, VIII and IX. The tests within each of these three groups are evidently somewhat related, but not significantly so. It seems certain that each of the sub tests of the Test of Woodworking Ability measures a factor somewhat different, or absolutely different from that which each of the other sub tests measures.

TABLE I

INTERCORRELATIONS AMONG SUB TEST SCORES ON
TEST OF WOODWORKING ABILITY FOR 252 CASES
IN GRADES V AND VI

| | | | | Sub Tests | | | | |
|---|---|---|---|---|---|---|---|---|
| Sub Tests | IX | VIII | VII | VI | V | IV | III | II |
| I | .20 | .05 | .19 | .05 | .10 | .10 | .38 | .52 |
| II | .16 | .22 | .25 | -.01 | .03 | .04 | .49 | |
| III | .13 | .28 | .24 | .00 | .06 | -.05 | | |
| IV | .18 | .09 | .10 | .32 | .08 | | | |
| V | .07 | .12 | .22 | .15 | | | | |
| VI | .03 | .10 | .05 | | | | | |
| VII | .33 | .40 | | | | | | |
| VIII | .32 | | | | | | | |

$PE_r$ (± .00-.42) = ± .04

$PE_r$ (± .43-.64) = ± .03

Correlations of sub test scores, Test of Woodworking Ability, and criterion scores and derived weighting factors for sub tests. Table II indicates the correlations of the sub test scores of the Test of Woodworking Ability with the criterion scores. The sub test scores were obtained

from the administration of the complete test to 252 boys
in the fifth and sixth grades of the public schools of a
local suburban town, and the criterion scores were made
by the same 252 boys. . The table also contains the weighting
factors for the nine sub tests derived from the above
correlations.

TABLE II

CORRELATIONS OF SUB TEST SCORES, TEST OF
WOODWORKING ABILITY (252 CASES IN GRADES V AND VI), AND
CRITERION SCORES; AND DERIVED WEIGHTING
FACTORS FOR EACH SUB TEST

| | Sub Tests | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | VII | VIII | IX |
| Correlation | .215 | .200 | .143 | .153 | .172 | .142 | .353 | .189 | .240 |
| Weighting Factor | 2.2 | 2.0 | 1.4 | 1.5 | 1.7 | 1.4 | 3.5 | 1.9 | 2.4 |

$$PE_r = \pm .04$$

From Table II it is evident that the coefficients of
correlation between the various sub test scores and the
criterion scores are all positive. Only one, however, the
correlation between sub test VII and the criterion, ap-
proaches any degree of significance. This would indicate
the scores on each sub test do have a relationship with
success in woodworking, but not a significant one.

The weighting factor for each sub test is equivalent to ten times the coefficient of correlation for that sub test. The weighting factor in each case is rounded to the nearest tenth. These weighting factors are used to obtain the weighted scores for the sub tests (Table III).

Critical ratios and indexes of ease of test items in Test of Woodworking Ability. Table III indicates the critical ratio (CR) and index of ease (P) of each item in sub tests I, II, III, VII, VIII and IX of the Test of Woodworking Ability. This data was computed from the results of the administration of the test to 252 boys in the fifth and sixth grades of the public schools of a local suburban town.

The level of acceptance/rejection of test items previously set up was a critical ratio of 2.576, or the 1% level of acceptance. Of the fifty items in the tests of tool knowledge (I, II and III) eight do not successfully meet this level. All of these items have indexes of ease in the lower extreme range, an indication that these items were too difficult in nature. Of the fifty-one items in sub tests VII, VIII, and IX, only one does not have a critical ratio which is statistically significant. This item has an index of ease of 62, which is within a desirable range, so the item is undoubtedly just a poor item in the test.

TABLE III

CRITICAL RATIO AND INDEX OF EASE OF EACH TEST ITEM IN SUB
TESTS I, II, III, VII, VIII, AND IX OF THE TEST OF
WOODWORKING ABILITY FOR 252 CASES IN GRADES
V AND VI

| ITEM | SUB TEST I | | SUB TEST II | | SUB TEST III | | SUB TEST VII | | SUB TEST VIII | | SUB TEST IX | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C.R. | P. | C.R. | P. | C.R. | P. | C.R. | P. | C.R. | P. | C.R. | P. |
| 1 | 2.63 | 94 | 2.92 | 59 | *1.00 | 10 | 6.15 | 81 | *1.73 | 62 | 6.57 | 65 |
| 2 | 8.10 | 55 | 6.21 | 49 | *0.00 | 7 | 8.10 | 60 | 3.70 | 83 | 7.14 | 60 |
| 3 | 4.54 | 44 | 6.50 | 75 | 3.74 | 14 | 9.40 | 63 | 7.69 | 52 | 3.97 | 89 |
| 4 | 6.08 | 51 | 5.73 | 78 | 5.03 | 32 | 8.79 | 45 | 15.08 | 49 | 6.37 | 72 |
| 5 | *1.89 | 8 | 5.39 | 32 | 6.11 | 42 | 10.52 | 52 | 4.23 | 26 | 6.45 | 45 |
| 6 | 4.86 | 19 | 8.06 | 63 | 7.65 | 42 | 9.52 | 45 | 8.40 | 65 | 3.17 | 35 |
| 7 | 4.85 | 19 | 4.63 | 51 | 6.95 | 41 | 9.64 | 62 | 12.30 | 58 | 9.01 | 58 |
| 8 | 4.92 | 20 | 5.43 | 20 | 3.25 | 13 | 6.73 | 51 | 15.22 | 46 | 6.94 | 59 |
| 9 | 3.28 | 31 | 8.98 | 64 | 3.56 | 16 | 8.67 | 66 | 4.17 | 84 | 4.79 | 87 |
| 10 | *1.53 | 8 | 7.55 | 61 | 7.83 | 53 | 5.17 | 32 | 13.77 | 42 | 5.85 | 73 |
| 11 | 4.23 | 77 | 5.89 | 54 | | | 11.49 | 66 | 6.86 | 74 | | |
| 12 | 4.43 | 75 | 4.61 | 18 | | | 12.83 | 58 | 20.71 | 45 | | |
| 13 | 4.43 | 75 | *2.13 | 19 | | | 16.70 | 59 | 19.19 | 46 | | |
| 14 | 2.71 | 33 | 5.18 | 21 | | | 13.35 | 54 | 16.60 | 44 | | |
| 15 | 5.56 | 36 | *1.99 | 10 | | | 8.36 | 73 | 13.60 | 49 | | |
| 16 | 4.65 | 78 | 3.34 | 11 | | | 14.05 | 62 | 9.85 | 44 | | |
| 17 | 6.82 | 38 | *1.07 | 12 | | | 14.05 | 62 | 11.04 | 36 | | |
| 18 | 2.84 | 11 | *2.03 | 8 | | | 10.80 | 49 | 10.81 | 33 | | |
| 19 | 2.99 | 17 | 3.05 | 11 | | | 12.43 | 64 | 8.51 | 32 | | |
| 20 | 7.67 | 37 | 2.81 | 16 | | | 13.01 | 61 | 11.51 | 38 | | |
| 21 | | | | | | | 12.46 | 58 | | | | |

* Items whose critical ratios are not
statistically significant.

The indexes of ease for the items within each sub test
indicate that a fairly wide range of difficulty is offered
by those items. These indexes of ease would be the basis
for a possible rearrangement of the items within each sub
test so as to provide for an ascending order of difficulty
of the items.

Derivation of the weighted sub test scores for the

Test of Woodworking Ability. Table IV indicates the
standard scores, the weighted scores and the rounded
weighted scores for all raw scores in each of the nine
sub tests of the Test of Woodworking Ability. This data
was derived from the results of administration of the
test to 252 boys in the fifth and sixth grades of the
public schools of a local suburban town.

TABLE IV

DERIVATION OF WEIGHTED SUB TEST SCORES
FOR THE TEST OF WOODWORKING ABILITY

| Raw Score | SUB TEST I | | | SUB TEST II | | | SUB TEST III | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stand. Score | Weigh. Score | Round. Score | Stand. Score | Weigh. Score | Round. Score | Stand. Score | Weigh. Score | Round. Score |
| 0 | | | | 2.73 | 5.48 | 5.5 | 3.29 | 4.59 | 4.5 |
| 1 | 2.58 | 5.70 | 5.5 | 3.07 | 6.14 | 6 | 4.00 | 5.60 | 5.5 |
| 2 | 2.93 | 6.45 | 6.5 | 3.40 | 6.80 | 7 | 4.71 | 6.59 | 6.5 |
| 3 | 3.28 | 7.20 | 7 | 3.73 | 7.46 | 7.5 | 5.43 | 7.60 | 7.5 |
| 4 | 3.62 | 7.97 | 8 | 4.07 | 8.14 | 8 | 6.14 | 8.60 | 8.5 |
| 5 | 3.97 | 8.74 | 8.5 | 4.40 | 8.80 | 9 | 6.85 | 9.58 | 9.5 |
| 6 | 4.32 | 9.49 | 9.5 | 4.73 | 9.46 | 9.5 | 7.57 | 10.57 | 10.5 |
| 7 | 4.66 | 10.26 | 10.5 | 5.07 | 10.14 | 10.0 | 8.28 | 11.59 | 11.5 |
| 8 | 5.01 | 11.02 | 11 | 5.40 | 10.80 | 11 | 8.99 | 12.58 | 12.5 |
| 9 | 5.35 | 11.77 | 12 | 5.73 | 11.46 | 11.5 | 9.71 | 13.57 | 13.5 |
| 10 | 5.69 | 12.54 | 12.5 | 6.07 | 12.14 | 12 | | | |
| 11 | 6.03 | 13.31 | 13.5 | 6.40 | 12.80 | 13 | | | |
| 12 | 6.38 | 14.05 | 14 | 6.73 | 13.46 | 13.5 | | | |
| 13 | 6.72 | 14.81 | 15 | 7.07 | 14.14 | 14 | | | |
| 14 | 7.07 | 15.55 | 15.5 | 7.40 | 14.80 | 15 | | | |
| 15 | 7.42 | 16.30 | 16.5 | | | | | | |
| 16 | 7.76 | 17.07 | 17 | | | | | | |

TABLE IV (continued)

| Raw Scores | SUB TEST IV Stand. Score | Weigh. Score | Round. Score | SUB TEST V Stand. Score | Weigh. Score | Round. Score | SUB TEST VI Stand. Score | Weigh. Score | Round. Score |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 1.81 | 2.71 | 2.5 | 2.04 | 3.52 | 3.5 | | | |
| 1 | 1.99 | 2.85 | 3 | 2.13 | 3.67 | 3.5 | 2.93 | 4.10 | 4 |
| 2 | 1.99 | 2.99 | 3 | 2.23 | 3.84 | 4 | 3.12 | 4.37 | 4.5 |
| 3 | 2.08 | 3.12 | 3 | 2.32 | 3.99 | 4 | 3.31 | 4.63 | 4.5 |
| 4 | 2.18 | 3.25 | 3 | 2.42 | 4.17 | 4 | 3.50 | 4.90 | 5 |
| 5 | 2.27 | 3.39 | 3.5 | 2.51 | 4.32 | 4.5 | 3.69 | 5.17 | 5 |
| 6 | 2.36 | 3.53 | 3.5 | 2.61 | 4.49 | 4.5 | 3.88 | 5.43 | 5.5 |
| 7 | 2.45 | 3.67 | 3.5 | | | | 4.08 | 5.71 | 5.5 |
| 8 | 2.54 | 3.81 | 4 | | | | 4.27 | 5.98 | 6 |
| 9 | 2.63 | 3.95 | 4 | | | | 4.46 | 6.24 | 6 |
| 10 | 2.72 | 4.09 | 4 | | | | 4.65 | 6.51 | 6.5 |
| 11 | 2.82 | 4.22 | 4 | | | | 4.84 | 6.78 | 7 |
| 12 | 2.91 | 4.36 | 4.5 | | | | 5.03 | 7.04 | 7 |
| 13 | 3.00 | 4.50 | 4.5 | 3.27 | 5.56 | 5.5 | 5.23 | 7.32 | 7.5 |
| 14 | 3.09 | 4.64 | 4.5 | 3.36 | 5.71 | 5.5 | 5.42 | 7.59 | 7.5 |
| 15 | 3.19 | 4.78 | 5 | 3.46 | 5.88 | 6 | 5.61 | 7.85 | 8 |
| 16 | 3.28 | 4.91 | 5 | | | | 5.80 | 8.12 | 8 |
| 17 | 3.37 | 5.05 | 5 | | | | 5.99 | 8.39 | 8.5 |
| 18 | 3.46 | 5.19 | 5 | | | | 6.18 | 8.65 | 8.5 |
| 19 | 3.55 | 5.33 | 5.5 | 3.83 | 6.51 | 6.5 | 6.38 | 8.93 | 9 |
| 20 | 3.64 | 5.47 | 5.5 | 3.92 | 6.66 | 6.5 | 6.57 | 9.20 | 9 |
| 21 | 3.73 | 5.60 | 5.5 | 4.02 | 6.83 | 7 | 6.76 | 9.46 | 9.5 |
| 22 | 3.83 | 5.74 | 5.5 | 4.11 | 6.99 | 7 | 6.95 | 9.73 | 9.5 |
| 23 | 3.92 | 5.88 | 6 | 4.21 | 7.16 | 7 | 7.14 | 10 | 10 |
| 24 | 4.01 | 6.02 | 6 | 4.30 | 7.31 | 7.5 | 7.33 | 10.26 | 10.5 |
| 25 | 4.10 | 6.15 | 6 | 4.40 | 7.48 | 7.5 | 7.52 | 10.53 | 10.5 |
| 26 | 4.19 | 6.29 | 6.5 | 4.49 | 7.63 | 7.5 | 7.71 | 10.79 | 11 |
| 27 | 4.28 | 6.43 | 6.5 | 4.59 | 7.80 | 8 | 7.90 | 11.06 | 11 |
| 28 | 4.37 | 6.57 | 6.5 | 4.68 | 7.96 | 8 | 8.09 | 11.33 | 11.5 |
| 29 | 4.47 | 6.71 | 6.5 | 4.78 | 8.13 | 8 | | | |
| 30 | 4.56 | 6.84 | 7 | 4.87 | 8.28 | 8.5 | | | |
| 31 | 4.65 | 6.98 | 7 | 4.97 | 8.45 | 8.5 | | | |
| 32 | 4.74 | 7.12 | 7 | 5.06 | 8.60 | 8.5 | | | |
| 33 | 4.83 | 7.26 | 7.5 | 5.16 | 8.77 | 9 | | | |
| 34 | 4.93 | 7.40 | 7.5 | 5.25 | 8.93 | 9 | | | |
| 35 | 5.02 | 7.53 | 7.5 | 5.35 | 9.10 | 9 | | | |
| 36 | 5.11 | 7.67 | 7.5 | 5.44 | 9.25 | 9 | | | |
| 37 | 5.70 | 7.81 | 8 | 5.54 | 9.42 | 9.5 | | | |
| 38 | 5.29 | 7.94 | 8 | 5.63 | 9.57 | 9.5 | | | |
| 39 | 5.39 | 8.08 | 8 | 5.73 | 9.74 | 9.5 | | | |
| 40 | 5.48 | 8.22 | 8 | 5.82 | 9.89 | 10 | | | |
| 41 | 5.57 | 8.36 | 8.5 | 5.92 | 10.06 | 10 | | | |

TABLE IV (continued)

| Raw Scores | SUB TEST IV | | | SUB TEST V | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stand. Score | Weigh. Score | Round. Score | Stand. Score | Weigh. Score | Round. Score | Stand. Score | Weigh. Score | Round. Score |
| 42 | 5.66 | 8.49 | 8.5 | 6.01 | 10.22 | 10. | | | |
| 43 | 5.75 | 8.63 | 8.5 | 6.11 | 10.39 | 10.5 | | | |
| 44 | 5.84 | 8.77 | 9. | 6.20 | 10.54 | 10.5 | | | |
| 45 | 5.93 | 8.91 | 9. | 6.30 | 10.71 | 10.5 | | | |
| 46 | 6.02 | 9.03 | 9. | 6.39 | 10.86 | 11. | | | |
| 47 | 6.12 | 9.17 | 9. | 6.48 | 11.02 | 11. | | | |
| 48 | 6.21 | 9.31 | 9.5 | 6.57 | 11.17 | 11. | | | |
| 49 | 6.30 | 9.44 | 9.5 | 6.67 | 11.34 | 11.5 | | | |
| 50 | 6.39 | 9.58 | 9.5 | 6.76 | 11.49 | 11.5 | | | |
| 51 | 6.49 | 9.72 | 9.5 | 6.86 | 11.66 | 11.5 | | | |
| 52 | 6.58 | 9.86 | 10. | 6.95 | 11.82 | 12. | | | |
| 53 | 6.67 | 10. | 10. | 7.05 | 11.99 | 12. | | | |
| 54 | 6.76 | 10.13 | 10. | 7.14 | 12.14 | 12. | | | |
| 55 | 6.85 | 10.27 | 10.5 | | | | | | |
| 56 | 6.94 | 10.41 | 10.5 | | | | | | |
| 57 | 7.04 | 10.56 | 10.5 | | | | | | |
| 58 | 7.13 | 10.69 | 10.5 | | | | | | |
| 59 | 7.22 | 10.84 | 11. | | | | | | |
| 60 | 7.31 | 10.97 | 11. | | | | | | |
| 61 | 7.40 | 11.11 | 11. | | | | | | |
| 62 | 7.50 | 11.25 | 11. | | | | | | |
| 63 | 7.59 | 11.39 | 11.5 | | | | | | |
| 64 | 7.68 | 11.53 | 11.5 | | | | | | |
| 65 | 7.77 | 11.66 | 11.5 | | | | | | |
| 66 | 7.86 | 11.80 | 12. | | | | | | |

| | SUB TEST VII | | | SUB TEST VIII | | | SUB TEST IX | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 3.05 | 10.66 | 10.5 | 3.16 | 6.00 | 6. | 1.80 | 4.34 | 4.5 |
| 1 | 3.22 | 11.27 | 11. | 3.36 | 6.38 | 6.5 | 2.32 | 5.57 | 5.5 |
| 2 | 3.39 | 11.88 | 12. | 3.56 | 6.76 | 7. | 2.83 | 6.79 | 7. |
| 3 | 3.57 | 12.49 | 12.5 | 3.76 | 7.14 | 7. | 3.35 | 8.04 | 8. |
| 4 | 3.74 | 13.09 | 13. | 3.91 | 7.52 | 7.5 | 3.86 | 9.26 | 9.5 |
| 5 | 3.91 | 13.70 | 13.5 | 4.16 | 7.90 | 8. | 4.38 | 10.51 | 10.5 |
| 6 | 4.09 | 14.30 | 14.5 | 4.36 | 8.28 | 8.5 | 4.89 | 11.74 | 11.5 |
| 7 | 4.26 | 14.90 | 15. | 4.56 | 8.66 | 8.5 | 5.41 | 12.98 | 13. |
| 8 | 4.43 | 15.51 | 15.5 | 4.76 | 9.04 | 9. | 5.92 | 14.21 | 14. |
| 9 | 4.61 | 16.11 | 16. | 4.96 | 9.42 | 9.5 | 6.44 | 15.46 | 15.5 |
| 10 | 4.78 | 16.71 | 16.5 | 5.16 | 9.80 | 10. | 6.95 | 16.68 | 16.5 |

TABLE IV (concluded)

| | SUB TEST VII | | | SUB TEST VIII | | |
|---|---|---|---|---|---|---|
| Raw Score | Stand. Score | Weigh. Score | Round. Score | Stand. Score | Weigh. Score | Round. Score |
| 11 | 4.95 | 17.32 | 17.5 | 5.36 | 10.18 | 10. |
| 12 | 5.13 | 17.93 | 18. | 5.56 | 10.56 | 10.5 |
| 13 | 5.30 | 18.54 | 18.5 | 5.76 | 10.94 | 11. |
| 14 | 5.47 | 19.15 | 19. | 5.96 | 11.32 | 11.5 |
| 15 | 5.65 | 19.77 | 20. | 6.16 | 11.70 | 11.5 |
| 16 | 5.82 | 20.37 | 20.5 | 6.36 | 12.08 | 12. |
| 17 | 5.99 | 20.98 | 21. | 6.56 | 12.46 | 12.5 |
| 18 | 6.17 | 21.59 | 21.5 | 6.76 | 12.84 | 13. |
| 19 | 6.34 | 22.19 | 22. | 6.96 | 13.22 | 13. |
| 20 | 6.51 | 22.79 | 23. | 7.16 | 13.60 | 13.5 |
| 21 | 6.69 | 23.40 | 23.5 | | | |

The rounded, weighted scores for the various sub tests were the scores used to compute the total score for each pupil on the Test of Woodworking Ability.

Distribution of intelligence quotients. Figure 10 consists of a histogram which indicates the distribution of the intelligence quotients of 252 fifth and sixth grade boys in the public schools of a local suburban town as measured by the Stanford Revision of the Binet-Simon Intelligence Scale. The mean, standard deviation, and the standard error of the mean of the distribution are also included.

The actual range of the intelligence quotients found among the 252 pupils in this study ran from a low of 63 to a high of 175. However, because of the small number of cases with intelligence quotients below 80 and above 138, and

because these few cases were spread so thinly over the additional "top" and "base" ranges, -80 and 138+ were used as the two extremes of the histogram in figure 10. This explains the piling up of cases at each of these extremes. That this did not greatly affect the mean of the standard deviation of the distribution is attested by the fact that the mean and standard deviation recently found for the entire elementary school population of the town involved were 112.09 and 12.70 respectively.

By inspection of the distribution, it is apparent that the intelligence quotients tend to distribute themselves symmetrically about the mean of the distribution. With the exception of the piling up at each extreme, the resultant curve approximates the normal curve of distribution. The fact that the extremes of the distribution fall at approximately ±3SD is another indication that the curve approximates normality.[1]

However, a comparison of the mean and standard deviation of the distribution (M = 109.99, SD = 12.05) with the mean and standard deviation expected of a true random population sample (M = 100, SD = 16.4) indicates that the group of pupils used in this study is a biased sample. The mean intelligence of the group is approximately 10 points higher than that of a random sample. The fact that the standard deviation of

[1] P = .073

the group is 4.35 points lower than that of a random
sample indicates that the intelligence quotients are
grouped more closely, are bunched up, so to speak,
nearer the mean than is true of the distribution of the
intelligence quotients of a random sample.

Intelligence Quotients

| Mean | 109.99 |
| S.D. | 12.05 |
| S.E. Mean | .76 |

Figure 10

Distribution of Intelligence Quotients
As Determined by Binet Tests, For
252 Cases in Grades V and VI

<u>Distribution of criterion scores.</u>  Figure 11 consists
of a histogram which indicates the distribution of the
criterion scores of 252 fifth and sixth grade boys in the
public schools of a local suburban town.  The criterion
score was derived from an arithmetical combination of the
crafts teacher's mark in the complete crafts course, the
teacher's mark in the woodworking for each pupil, and the
score assigned each pupil's woodwork project by the writer.
The mean, standard deviation, and standard error of the
mean for the distribution are also included.

An analysis of figure 11 indicates that the range of
criterion scores obtained by the 252 pupils runs from a
low of 25 to a high score of 3.  As was explained in
Chapter III, the better the criterion score actually was,
the lower is the figure representing the score.  Conversely,
the worst actual scores are represented by the highest
figures.  Comparing the range obtained with the possible
range (27 to 3) one finds that the top of the range of
possible scores is exhausted.  This is not too serious a
fault, however, as only three pupils of the 252 achieve
this score.

By inspection of the distribution, it is quite apparent
that the scores obtained tend to distribute themselves
symmetrically about the mean of the distribution.  However,
the resultant curve deviates from the normal curve of dis-

tribution.  The curve obtained shows a significant positive

skewness and is also very slightly platykurtic in nature,

thus accounting for the deviation from normality.[1]



Scores

Mean      14.23
S.D.       4.26
S.E. Mean  .27

Figure 11

Distribution of Criterion Scores For
252 Cases in Grades V And VI

Distribution of total scores on Test of Woodworking

Ability.  Figure 12 consists of a histogram which indicates

[1] P = .000 , Sk = +1.620 , Ku = .276

Scores

Mean 89.62
S.D. 9.89
S.E. Mean .62
Figure 12
Distribution of Total Scores on Test
Of Woodworking Ability For 252 Cases In
Grades V and VI

the distribution of the total scores achieved on the
Test of Woodworking Ability by 252 fifth and sixth grade
boys in the public schools of a local suburban town. The
mean, standard deviation and the standard error of the
mean for the distribution are also included.

An analysis of figure 12 indicates that the range of
the total weighted scores obtained on the Test of Woodworking
Ability by the 252 pupils included in the study runs from a
low of 63.5 to a high score of 113. Comparing this with
the possible range of the test (45.5 to 148.5) indicates
that there is sufficient base and sufficient top to the
range of possible test scores.

By inspection of the distribution, it is quite apparent
that the scores obtained tend to distribute themselves
symmetrically about the mean of the distribution. By eye,
the resultant curve approximates the normal curve of
distribution[1] The fact that the extremes of the distribution
fall at approximately $\pm$ 3SD is another indication that the
curve approximates normality.

Intercorrelations among test, criterion, and intelligence
scores. Table V indicates the intercorrelations among the
following scores for 252 fifth and sixth grade boys in the
public schools of a local suburban town: the total scores
on the Test of Woodworking Ability, the criterion scores,

[1] P = .155

and the intelligence quotients as determined by the
Stanford Revision of the Binet-Simon Intelligence Scale.

TABLE V

INTERCORRELATIONS AMONG TOTAL SCORES
ON TEST OF WOODWORKING ABILITY;
CRITERION SCORES; AND INTELLIGENCE
QUOTIENTS, AS DETERMINED BY BINET
TESTS, FOR 252 CASES IN GRADES V AND VI

|  | Criterion Scores | Total Test Scores |
|---|---|---|
| Binet I.Q.'s | .148 | .266 |
| Total Test Scores | .388 | |

$$PE_r = \pm.04$$

As may be seen in Table V, the coefficient of
correlation between the Binet intelligence quotients and
the criterion scores is a very low, positive correlation
($+$.148); that between the Binet intelligence quotients
and the total scores on the Test of Woodworking Ability
slightly higher ($+$.266); and that between the total test
scores and the criterion scores still higher ($+$.388).
Partialling out intelligence, the resulting coefficient of
correlation between the total test scores and the
criterion scores, which may be considered the coefficient

of validity for the test, is $+.366$.  The probable error
of this coefficient is $\pm.04$, which indicates that there
is a 50-50 chance that the true coefficient of correla-
tion lies between $+.326$ and $+.406$.  The coefficient of
correlation between the total test scores and the criterion
scores indicate a forecasting efficiency of approximately
7.9%.  In other words, the predictive efficiency of the
Test of Woodworking Ability, based on the results of this
study, is only 8% better than a sheer guess.

Coefficient of reliability for the Test of Wood-
working Ability.  The coefficient of reliability for the
Test of Woodworking Ability, as determined by the ad-
ministration of the test to 252 fifth and sixth grade
boys in the public schools of a local suburban town, is
.886.  This indicates a desirable degree of consistency
in this preliminary form of the instrument.

# CHAPTER V

## SUMMARY AND CONCLUSIONS

Summary of the study. The purpose of this study
is to develop and construct a paper and pencil group test
which, when administered to boys at the elementary school
level,will/will not measure their ability to do wood-
work. A careful search of the literature concerning shop
tests, tests of mechanical aptitude and ability, and the
construction of aptitude tests was conducted. On the
basis of the results of this search, items and sub tests
for a first copy of the Test of Woodworking Ability,
together with the necessary administrative directions,
were drawn up.

The test was first given to a trial group to discover
basic weaknesses, then administered to all the boys in the
fifth and sixth grades of the public schools of a local
suburban town. The completed tests were scored, using
the scoring keys enclosed in the appendix of this study.

The pupils involved in this study were all partici-
pating in a crafts course given as a part of their school
work. During this course, each one made one of three
woodworking projects, a tie rack, a tea pot holder, or an
ink stand, referred to in this study as the criterion
projects. The total criterion score, against which the
Test of Woodworking Ability was validated, consists of

the sum of three scores: the mark assigned by the crafts teacher to each boy for his year's work in the course, the mark assigned by the crafts teacher to each boy for his woodworking project, and the score assigned to each boy's completed project by the writer.

The statistical treatment of the data included the following:

1. Distributions of sub test scores.

2. Intercorrelations among sub tests.

3. Correlations between sub tests and criterion.

4. Weighting factors for sub tests.

5. Critical ratios of test items.

6. Indexes of ease of test items.

7. Conversion of raw sub test scores to standard scores which were then weighted and totaled.

8. Distributions of intelligence quotients, criterion scores, and total test scores.

9. Intercorrelations among intelligence, criterion and total test scores.

10. Correlation between total test scores and criterion scores with intelligence partialled out.

11. Estimate of test reliability.

Conclusions drawn from the study. From the analysis of the data given in Chapter IV, the following conclusions concerning the Test of Woodworking Ability were drawn:

1.   The distributions of scores for sub tests I, II,
IV, and VI result in curves which approximate normal
curves.

2.   The distributions of scores for sub tests III, V,
VII, VIII, and IX deviate significantly from the normal
curve.

3.   The coefficients of correlation among the various
sub tests are all very low or zero coefficients.  This
indicates that different factors are being measured
by the various tests.

4.   The coefficients of correlation of the various sub
tests with the criterion scores are low positive
coefficients.

5.   The item analysis revealed that most of the items
of the test met the 1% level of significance (CR = 2.576).

6.   The indexes of ease for the test items indicate
a need for a rearrangement of the order of occurrence
of the items.

7.   The distribution of intelligence quotients for the
children involved in this study indicates that the
population used is a biased one.

8.   The distribution of criterion scores results in a
curve which is significantly positively skewed.

9.   The distribution of total test scores results in
a curve which approximates the normal curve, with a
mean score of 89.62 and a standard deviation of 9.89.

10. The coefficient of correlation between intelligence and the criterion scores is $+.148 \pm .04$.

11. The coefficient of correlation between intelligence and the total test scores is $+.266 \pm .04$.

12. The coefficient of correlation between the total test scores and the criterion scores is $+.388 \pm .04$.

13. Partialling out intelligence, the coefficient of correlation between the total test scores and the criterion scores is $+.366 \pm .04$.

14. The predictive efficiency of the test is approximately 7.6%.

15. The "foot rule" coefficient of reliability for the test is .886.

16. The Test of Woodworking Ability in its present status, and as a factor in itself, is practically worthless as a predictive instrument. This conclusion is based upon the statistically insignificant test scores and the criterion scores, which is taken to be the coefficient of validity for the test. The test may be of value as one of a series of factors which might be useful for the prognosis of woodworking shop ability or aptitude, but the determination of such usefulness is beyond the scope of this study.

# CHAPTER VI

## LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FURTHER RESEARCH

### Limitations of the study.

1.  The population sample used in this study was limited to pupils of one community, therefore it was not a true random sample.

2.  The Test of Woodworking Ability was administered in part by various classroom teachers and school administrators instead of by one test administrator.

3.  Each pupil completed one of a choice of three projects, rather than one standard criterion project.

4.  Conditions under which the criterion projects were made were not standardized or controlled.

5.  An arithmetical combination of subjective scores was used as the criterion score for validation purposes.

    a.  The teacher's mark for each pupil in the crafts course was a subjective score.

    b.  The teacher's mark for each pupil in woodworking was a subjective score.

    c.  The scores assigned completed
projects by the writer were subjective
scores.

6.  Statistical treatment of the test results
indicate a need for a revision of the test
before final conclusions may be drawn.

7.  A performance-type test would have un-
doubtedly provided a more valid test of wood-
working ability.

    a.  An attempt was made to measure
performance by means of a paper-pencil
type test.

Suggestions  for further research.

1.  Conduct further statistical study of the
Test of Woodworking Ability.

    a.  Compare results of test with results
of California Test of Mental Maturity
(Language, Non-language, and Total Scores).

    b.  Compare results of test with various
phases of academic achievement as measured
by the Iowa Every-Pupil Tests of Basic Skills.

    c.  Make a factorial analysis of sub test
scores.

    d.  Run serial correlations of various
combinations of sub tests with the criterion

score.

    e. Determine the increase, if any, in validity coefficient resulting from use of part scores weighted in proportion to their correlation with the criterion scores over that resulting from use of unweighted standard scores.

2. Conduct a follow-up study of pupils in junior high school shop work.

    a. Determine prediction possibilities of the Test of Woodworking Ability.

3. Revise the Test of Woodworking Ability.

    a. Eliminate or revise items with critical ratios which are not statistically significant according to the item analysis.

    b. Arrange items in order of increasing difficulty within each sub test according to the index of ease.

    c. Analyze the administrative directions for the purpose of eliminating evident occasional misunderstanding of directions by pupils who took the test.

4. Administer revised test to a properly selected small sample population.

5. Develop a means of objectively analyzing a project in woodworking, and use this analysis

as the criterion for validation of the
revised test.

    a.  The project should be completed by
each pupil under standardized, controlled
conditions.

6.  Conduct further statistical study of
revised test.

    a.  Make a correlation study of the results
of the revised test and results on one or
more tests of mechanical aptitude, mechanical
ability, or mechanical comprehension.

    b.  Compare the results of the revised test
and an interest inventory or analysis.

    c.  Compare the results of the test at
various grade levels, using a critical
ratio technique.

    d.  Compare the results of the test at
various chronological age levels, using a
critical ratio technique.

    e.  Compare the results of the test at various
mental age levels, using a critical ratio
technique.

7.  Devise and develop a performance-type test
to measure woodworking ability and/or aptitude.

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APPENDIX

77

ADMINISTRATIVE DIRECTIONS

FOR

TEST OF WOODWORKING ABILITY

WOODWORKING SHOP APTITUDE TEST

To the administrator:

Please read directions below thoroughly before administering
this test. Refer also to the sub-tests as you read the directions.

When you are ready to give the test, have a test booklet for
each pupil to be tested, a sharp pencil for each, and a few for spares
in case of breakage. The room in which the tests are to be given should
be at a comfortable temperature, and quiet. Pupils should not be disturbed
while taking the test.

Distribute the booklets and follow the direction below, using
the exact language contained in the directions. Some of the pages of the
test booklets did not copy well. We have tried to make certain that the
proper responses are legible or visible. Try to avoid discouragement on
the part of the pupils because of this. Do not help any pupils, but ask
them to do the very best they can with the material.

Directions:

"PLACE YOUR BOOKLETS FLAT ON YOUR DESK, FIRST PAGE UP.
BE SURE THAT YOU HAVE A SHARP PENCIL AND PUT EVERYTHING ELSE AWAY.
YOU SHOULD HAVE ONLY THE TEST AND YOUR PENCIL ON YOUR DESK."

(Check to make sure each pupil has a test booklet and a sharp pencil.
Have a supply of sharpened pencils on hand in case a pupil should break his.)

"FILL IN THE INFORMATION ASKED FOR AT THE TOP OF THE FIRST
PAGE. BE SURE TO WRITE YOUR LAST NAME FIRST. WHERE IT ASKS FOR YOUR AGE,
TELL HOW OLD YOU ARE IN YEARS AND MONTHS."

(Allow sufficient time for all to complete and then check
to make sure each pupil has filled in all information required).

Test I:

"NOW LOOK CAREFULLY AT THE PICTURES BELOW THE INFORMATION YOU
HAVE JUST FILLED IN. EACH THING IN THE PICTURES ON THE LEFT HAND SIDE OF
THE PAGE GOES BEST WITH SOMETHING IN ONE OF THE PICTURES ON THE RIGHT HAND
SIDE OF THE PAGE. LOOK AT PICTURE A ON THE LEFT. WHICH PICTURE ON THE RIGHT
GOES BEST WITH PICTURE A? Yes, THE PICTURE OF THE NAIL. WHY DOES THE
PICTURE OF THE HAMMER GO BEST WITH THE PICTURE OF THE NAIL?"

"YES, BECAUSE A HAMMER IS **USED** WITH NAILS. WHAT IS THE NUMBER UNDER THE PICTURE OF THE NAIL? YES, THE NUMBER IS 2. LOOK AT THE SMALL BOXES UNDER THE PICTURE ON THE LEFT HAND SIDE. FIND THE BOX MARKED A . WHAT NUMBER HAS BEEN PLACED IN THE BOX? YES, 2 , THE NUMBER OF THE PICTURE THAT GOES BEST WITH PICTURE A."

"WHAT PICTURE GOES BEST WITH PICTURE B ? YES, PICTURE 4, SO WE PLACE A FIGURE 4 IN THE BOX LETTERED B. Why does picture 4 GO BEST WITH PICTURE B ? YES, BECAUSE THEY ARE BOTH WRENCHES AND ARE BOTH USED TO TIGHTEN OR LOOSEN NUTS AND BOLTS."

"DO C." (Pause) "WHAT NUMBER DID YOU PUT IN BOX C? YES, NUMBER 3 IS RIGHT. WHY DOES PICTURE 3 GO BEST WITH PICTURE C ? YES, BECAUSE THE BIT IN PICTURES 3 IS USED WITH THE BIT BRACE IN PICTURE C."

"WHEN I TELL YOU TO BEGIN, TURN TO PAGE 2 AND DO THE WHOLE PAGE THE SAME WAY. DO ALL THE PICTURES ON EACH PAGE THAT YOU HAVE TIME FOR. IF YOU ARE NOT SURE OF A PICTURE, GUESS. WHEN YOU FINISH PAGE 2, GO RIGHT ON AND DO PAGES 3, 4, 5 AND 6 THE SAME WAY. DON'T STOP, BUT KEEP RIGHT ON GOING UNTIL YOU FINISH PAGE **6**. The pictures on pages 2 And 3 GO TO= GETHER THE SAME WAY THE HAMMER AND NAIL DO. READY? BEGIN!"

Test II

At the end of eight (8) minutes, say:
"Attention please!"
"IF YOU HAVEN'T ALREADY STARTED PAGE 4, TURN TO PAGE 4 NOW AND CONTINUE WORKING. THESE PICTURES ON PAGE 4 AND 5 GO TOGETHER THE SAME WAY THE BIT AND BIT STOCK DID IN THE PRACTICE EXERCISES."

Test III

At the end of fifteen (15) minutes (total time), say,

"IF YOU HAVEN'T ALREADY STARTED PAGE 6, TURN TO PAGE 6
NOW AND CONTINUE WORKING. THESE PICTURES GO TOGETHER
THE SAME WAY THE TWO WRENCHES DID."

At the end of eighteen (18) Minutes (total test time),
say,

"STOP, EVERBODY STOP! PENCILS UP!"

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(If test is to be given in two sessions, see note (*) at end of directions
and collect papers at this point. Return at the beginning of the second
session.)

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Test IV:

"TURN TO PAGE 7.  PUT YOUR PENCIL ON THE WAVY LINE AT THE LETTER A.
TRY TO TRACE THAT LINE WITH YOUR PENCIL, ALL THE WAY TO THE LETTER Z.  GO
AHEAD AND TRY IT.  TRY TO KEEP YOUR PENCIL RIGHT ON THE WAVY LINE.  WORK
AS QUICKLY AS YOU CAN.  DON'T CHANGE YOUR LINE ONCE YOU HAVE MADE IT.  ALL
RIGHT - STOP."

(Check to see if all pupils understand the directions.)

"WHEN I TELL YOU TO BEGIN, TURN TO PAGE 8 AND DO THE SAME THING THERE.
READY?  BEGIN!"

At the end of two and one-half (2½) minutes, say:

"STOP, EVERYBODY STOP!  PENCILS UP!"

Test V

"TURN BACK TO PAGE 7 AGAIN.  AT THE BOTTOM OF THE PAGE IS ANOTHER
PRACTICE.  PUT YOUR PENCIL ON THE DOT MARKED A.  NOW MOVE YOUR PENCIL TO THE
RIGHT, AND GO RIGHT THROUGH THE OPENING IN THE FIRST UPRIGHT LINE.  NOW
CONTINUE THE LINE AND GO RIGHT THROUGH THE NEXT OPENING.  KEEP ON GOING THE
SAME WAY THROUGH ALL THE OPENINGS.  BE SURE NOT TO TOUCH EITHER SIDE OF THE
OPENING WITH YOUR LINE IF YOU CAN HELP IT.  DON'T MAKE ANY LINE OVER; DON'T
ERASE.  MAKE JUST A SINGLE LINE.  SEE IF YOU CAN REACH THE LETTER Z."

(Check to see if all pupils understand the directions.)

"ALL RIGHT, STOP!  WHEN I TELL YOU TO BEGIN, TURN TO PAGE 9 AND DO THE
EXERCISE THERE THE SAME WAY THAT YOU HAVE DONE THIS PRACTICE EXERCISE.
READY?  BEGIN!"

At the end of two (2) minutes, say:

"STOP, EVERYBODY STOP!  PENCILS UP."

Test VI

"TURN TO PAGE 10. LOOK AT THE FIRST CIRCLE IN THE TOP ROW OF
FIVE CIRCLES. NOTICE THAT THERE ARE TWO CIRCLES THERE, ONE INSIDE THE
OTHER. PLACE AN X INSIDE THE SMALLER CIRCLE. MAKE SURE ALL THE ENDS
OF THE X TOUCH THE INNER CIRCLE, BUT DO NOT TOUCH THE OUTER CIRCLE. NOW
FINISH THE OTHER FOUR IN THAT SAME ROW."

(Check to see that all pupils understand the directions.)

"WHEN I TELL YOU TO BEGIN, DO ALL THE REST OF THE CIRCLES ON THE PAGE
THE SAME WAY. DO THEM AS QUICKLY AS YOU CAN - BUT BE SURE TO HAVE YOUR
X's TOUCH THE INNER CIRCLE, BUT NOT THE OUTER. " "READY? BEGIN?"

At the end of _four (4) minutes_, say:

"STOP, EVERBODY STOP! PENCILS UP."

Test VII

"TURN TO PAGE 11. IN THE FIRST SQUARE, MARKED NUMBER ONE,
THERE IS A GROUP OF THREE DOTS WHICH MAKES A TRIANGLE. IN THE THIRD
SQUARE AFTER THIS ONE IS THIS SAME GROUP OF THREE DOTS, MAKING A TRIANGLE.
DRAW LINES BETWEEN THE DOTS SO YOU WILL BE SURE TO SEE THE TRIANGLE.
DRAW CIRCLE AROUND THE LETTER C TO SHOW THAT THAT IS THE SQUARE THAT HAS
THE THREE DOTS."

"LOOK AT THE SQUARE NUMBER TWO. FIND THE SQUARE THAT HAS
FOUR DOTS LIKE IT. WHICH SQUARE IS IT? THAT'S RIGHT - THE SQUARE
LETTERED B . DRAW A CIRCLE AROUND THE LETTER B."

"DO THE NEXT ONE JUST LIKE THAT."

(Check to make sure that all pupils understand the directions.)

"WHEN I TELL YOU TO BEGIN, TURN TO PAGE 12 AND DO THE WHOLE PAGE
THE SAME WAY. WHEN YOU FINISH PAGE 12, GO RIGHT ON TO PAGES 13 and 14.
READY? BEGIN!"

At the end of one and _one-half (1½) minutes_, say:

"IF YOU HAVEN'T ALREADY FINISHED PAGE 12 TURN TO PAGE 13 AND KEEP
ON GOING."

At the end of _three (3) minutes_ (total time this test), say:

"IF YOU HAVEN'T ALREADY FINISHED PAGE 13, TURN TO PAGE 14 AND KEEP
ON GOING."

Woodworking Shop Aptitude Test

At the end of <u>four (4) minutes</u>, say

"STOP, EVERYBODY STOP! PENCILS UP!"

## Test VIII

"TURN BACK TO PAGE 11 AGAIN. IN THE MIDDLE OF THE PAGE ARE DRAWINGS WHICH REPRESENT TWO PARTS OF A RULER. BENEATH THE RULER IT SAYS ONE-HALF INCH. FIND THE ARROW WHICH POINTD TO ONE-HALF INCH ON THE RULER. HOW IS THAT ARROW MARKED? YES, WITH THE CAPITAL LETTER A. SO WE PUT A CAPITAL LETTER A IN THE SPACE AFTER THE ONE-HALF INCH BELOW THE RULER."

(Check to see that all pupils understand the directions)

"WHEN I TELL YOU TO BEGIN, TURN TO PAGE 15 AND DO THAT PAGE JUST THE SAME WAY YOU HAVE DONE THESE EXAMPLES. READY! BEGIN!"

At the end of <u>five (5) minutes</u> , say:

"STOP, EVERYBODY STOP! PENCILS UP!

## Test IX

"TURN BACK TO PAGE 11 ONCE AGAIN. LOOK AT THE PAIRS OF LINES AT THE BOTTOM OF THE PAGE. EACH PAIR OF LINES MAKES AN ANGLE OR CORNER. FIND THE CORNER MARKED ONE. AFTER IT YOU WILL FIND FIVE MORE ANGLES MARKED A, B, C, D, E. FIND THE ANGLE WHICH IS THE SAME AS ANGLE ONE, AND HAS THE TWO LINES, WHICH MAKE THE ANGLE, OF THE SAME LENGTH. WHICH ANGLE IS THAT? YES, ANGLE C, SO WE DRAW A SMALL CIRCLE AROUND THE LETTER C. DO YOU ALL SEE THAT ANGLE ONE AND ANGLE C ARE EXACTLY AS SHARP AS EACH OTHER - AND THAT THE SIDES ARE OF THE SAME LENGTH?"

"LOOK AT ANGLE TWO. WHICH ANGLE FOLLOWING THAT ONE IS JUST THE SAME? YES, ANGLE E, SO WE DRAW A CIRCLE AROUND THE LETTER <u>E</u> ."

(Check to make sure all pupils understand what they are supposed to do.)

"WHEN I TELL YOU TO BEGIN, TURN TO PAGE 16 AND DO THAT PAGE THE SAME WAY WE HAVE DONE THESE EXAMPLES. WHEN YOU FINISH PAGE 16, GO RIGHT ON TO PAGE 17. READY? BEGIN! "

After <u>one (1) minute</u>, say:-

-6-

Woodworking Shop Aptitude Test


"IF YOU HAVEN'T ALREADY FINISHED PAGE 16 GO RIGHT ON TO PAGE 17 NOW."

At the end of two (2) minutes, (total time this test), say:-

"STOP, EVERYBODY STOP! PENCILS UP!"

Note (*)


Note (*)

"Put your pencils away, and take out your pens. Start at the beginning of the test now and finish any parts of it that you did not finish before. Do not change anything you did before. When the whole test is finished close your booklet and bring it quietly up to me."

# TEST OF

# WOODWORKING ABILITY

NAME _____     SCORE

           Last                First                    1 _____

SCHOOL _____ GRADE _____              11 _____

                                                   111 _____

TEACHER _____ CITY _____              IV _____

                                                     V _____

DATE _____ AGE _____               11 _____
       Month      Day          Years   Months

                                                   V11 _____

BIRTHDAY _____          V111 _____
           Month       Day       Year

                                                    1C  _____

                                                  TOTA. _____



A          C          |          1          3

B                     |          2          4

A - 2        B -        C -

87

A

F

B

G

C

H

D

I

E

J

1

2

3

4

5

6

7

8

9

10

11

12

A-

B-

C-

D-

E-

F-

G-

H-

I-

J-

A  F  1  7

B  G  2  8

C  H  3  9

C  I  4  10

D  J  5  11

6  12

A

F

B

G

C

H

D

I

E

J

I

2

3

4

5

6

T

8

9

10

11

12

| A- | E- | I- |
|----|----|----|
| B- | F- | J- |
| C- | G- | |
| D- | H- | |

A

C

B

D

E

| A - | E - | I - |
| --- | --- | --- |
| B - | F - | J - |
| C - | G - | |
| D - | H - | |

J

A

F

1

7

B

G

2

E

C

H

3

9

D

I

4

10

E

J

5

11

A~

B~

C~

D~

E~

F~

G

H~

I~

J~

6

12

A

Z

3 feet .............. 3 feet 1 1/4 inches

SCORING KEYS

FOR

TEST OF WOODWORKING ABILITY

## 2. 104

| | 2 | | 4 | | 6 |
| | 9 | | 8 | | 1 |
| | 3 | | 5 | | |
| | 11 | | 7 | | |

## 3.

| | 1 | | 6 | | 10 |
| | 5 | | 11 | | 9 |
| | 7 | | 2 | | |
| | 3 | | 8 | | |

## 4.

| | 5 | | 4 | | 11 |
| | 2 | | 1 | | 12 |
| | 3 | | 7 | | |
| | 6 | | 10 | | |

## 5.

| | 9 | | 10 | | 4 |
| | 5 | | 12 | | 8 |
| | 11 | | 3 | | |
| | 6 | | 2 | | |

## 6.

| | 12 | | 11 | | 4 |
| | 10 | | 7 | | 1 |
| | 9 | | 3 | | |
| | 2 | | 6 | | |

| | | | |
|---|---|---|---|
| 23 inches ...............N... | | 2 feet ................. P |
| 2 1/2 inches ..............I... | | 4 feet 2 1/8 inches ......i |
| 51 1/4 inches ............l... | | 2 feet 1 5/16 inches ....T |
| 15/16 inches ............D... | | 2 feet 1 3/8 inches .....U |
| 49 5/8 inches ...........f... | | 4 feet 9/16 inches .....b |
| 3 1/2 inches ............L... | | 1 feet 11 inches .......N |
| 3/4 inches ..............C... | | 4 feet 2 1/16 inches ....p |
| 24 7/8 inches ...........R... | | 4 feet 1 11/16 inches ...g |
| 50 inches ...............h... | | 4 feet 7 5/16 inches ....m |
| 1 7/16 inches ..........F... | | 4 feet 4 3/8 inches .....N |

PLANS FOR

CRITERION PROJECTS

# TIE RACK

⅛ HOLE

½" HOLE - ¼" DEEP

¾ STOCK

½" DIA. DOWEL

3

11

3

3

2

3

2

2

9

¾

$\frac{3}{4}$

5

5

5

$\frac{3}{8}$

$\frac{1}{2}$

$\frac{1}{2}$

$\frac{1}{2}$

$\frac{3}{8}$

TEA POT STAND

PICTURE - GLUE
TO WOOD

CARDBOARD- GLUE
TO WOOD

INK STAND

3/4" STOCK

1/4" PLYWOOD

SUGGESTED

CRITERION SCORE SHEET

Identification Number

1.  Length **
    (A-B)

2.  Width
    (C-D)

3.  Width
    (E-F)

4.  Width *,***
    (G-H)

5.  Width *,***
    (I-J)

6.  Width *,***
    (K-L)

7.  Corner
    Angle (A)

8.  Corner
    Angle (B or B-1)

9.  Side
    Square (C)

10. Side
    Square (D)

11. Side
    Square (E)

12. Side
    Square (F)

13. Side *,***
    Square (M)

14. Side *,***
    Square (N)

15. End **
    Square (O)

16. End **
    Square (P)

17. Chamfer
    Angle (C)

18. Chamfer
    Angle (D)

19. Chamfer
    Angle (E)

20. Chamfer
    Angle (F)

21. Chamfer
    Angle (M or O)

22. Chamfer
    Angle (N or P)

23. Chamfer
    Width (C)

24. Chamfer
    Width (D)

25. Chamfer
    Width (E)

26. Chamfer
    Width (F)

27. Chamfer
    Width (M or O)

28. Chamfer
    Width (N or D)

29. Location
    (Q)

30. Location
    (R)

31. Location
    (S)

32. Location
    (T)

33. Location
    (U)

34. Location
    (V)

35. Location *
    (W)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36. Location * (X) | | | | | | | | | | | | | | | |
| 37. Length (a) | | | | | | | | | | | | | | | |
| 38. Length (b) | | | | | | | | | | | | | | | |
| 39. Length * (c) | | | | | | | | | | | | | | | |
| 40. Length * (d) | | | | | | | | | | | | | | | |
| 41. Width **,*** (e) | | | | | | | | | | | | | | | |
| 42. Width **,*** (f) | | | | | | | | | | | | | | | |
| 43. Hole (Part Way)(g) | | | | | | | | | | | | | | | |
| 44. Hole (Part Way)(h) | | | | | | | | | | | | | | | |
| 45. Hole ** Location (j) | | | | | | | | | | | | | | | |
| 46. Hole ** Location (k) | | | | | | | | | | | | | | | |
| 47. Hole **,*** Location (l) | | | | | | | | | | | | | | | |
| 48. Hole **,*** Location (m) | | | | | | | | | | | | | | | |
| 49. Hole Perpendicular (g) | | | | | | | | | | | | | | | |
| 50. Hole Perpendicular (h) | | | | | | | | | | | | | | | |
| 51. Sawing | | | | | | | | | | | | | | | |
| 52. Planing | | | | | | | | | | | | | | | |
| 53. Sanding | | | | | | | | | | | | | | | |
| 54. Painting | | | | | | | | | | | | | | | |
| 55. Parts Made over | | | | | | | | | | | | | | | |

56. Time

57. Tool
    Selection

 

       *      Not scored on Project No. 1

      **    Not scored on Project No. 2

     ***  Not scored on Project No. 3

GENERAL PURPOSE TABLE

# GENERAL PURPOSE TABLE

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10-5 | 115 | 4 | 4 | 4 | 16 | 7 | 9 | 1 | 33 | 41 | 14 | 11 | 5 | 2 | 10.5 | 11.5 | 5.5 | 7.5 | 10 | 7.5 | 17.5 | 8 | 7 | 85 |
| 2 | 10-0 | 110 | 3 | 3 | 3 | 9 | 11 | 7 | 3 | 34 | 13 | 14 | 7 | 2 | 5 | 13.5 | 10 | 7.5 | 7.5 | 5.5 | 7.5 | 15 | 7 | 10.5 | 84 |
| 3 | 10-5 | 107 | 2 | 2 | 2 | 6 | 5 | 6 | 1 | 22 | 37 | 3 | 9 | 9 | 6 | 7.5 | 9.5 | 5.5 | 5.5 | 9.5 | 4.5 | 16 | 9.5 | 11.5 | 75 |
| 4 | 10-2 | 120 | 5 | 9 | 8 | 22 | 6 | 7 | 2 | 29 | 31 | 18 | 13 | 6 | 5 | 9.5 | 10 | 6.5 | 6.5 | 8.5 | 8.5 | 18.5 | 8.5 | 10.5 | 87 |
| 5 | 9-11 | 119 | 1 | 3 | 5 | 9 | 10 | 7 | 2 | 26 | 33 | 12 | 11 | 15 | 9 | 12.5 | 10 | 6.5 | 6.5 | 9 | 7 | 17.5 | 11.5 | 15.5 | 96 |
| 6 | 10-1 | 112 | 3 | 2 | 2 | 7 | 7 | 3 | 3 | 39 | 35 | 12 | 14 | 7 | 7 | 10.5 | 7.5 | 7 | 8 | 9 | 7 | 19 | 8.5 | 18 | 88 |
| 7 | 11-1 | 130 | 2 | 1 | 1 | 4 | 7 | 7 | 0 | 28 | 32 | 7 | 20 | 19 | 6 | 10.5 | 10 | 4.5 | 6.5 | 8.5 | 5.5 | 23 | 13 | 11.5 | 93 |
| 8 | 9-11 | 116 | 5 | 8 | 4 | 17 | 8 | 2 | 2 | 17 | 37 | 8 | 12 | 6 | 5 | 11 | 7 | 6.5 | 5 | 9.5 | 6 | 18 | 8.5 | 10.5 | 82 |
| 9 | 10-4 | 107 | 5 | 8 | 3 | 16 | 11 | 9 | 3 | 30 | 38 | 10 | 2 | 5 | 3 | 13.5 | 11.5 | 7.5 | 7 | 9.5 | 6.5 | 12 | 8 | 8 | 83.5 |
| 10 | 10-6 | 114 | 5 | 6 | 5 | 16 | 5 | 0 | 3 | 26 | 27 | 11 | 3 | 2 | 5 | 8.5 | 5.5 | 7.5 | 6.5 | 8 | 7 | 12.5 | 7 | 10.5 | 72 |
| 11 | 9-7 | 153 | 4 | 3 | 2 | 9 | 5 | 7 | 0 | 35 | 45 | 17 | 15 | 18 | 8 | 8.5 | 10 | 4.5 | 7.5 | 10.5 | 8.5 | 20 | 13 | 14 | 96.5 |
| 12 | 10-8 | 104 | 1 | 2 | 4 | 7 | 12 | 11 | 3 | 31 | 25 | 18 | 13 | 4 | 6 | 14 | 13 | 7.5 | 7 | 7.5 | 8.5 | 18.5 | 7.5 | 11.5 | 95 |
| 13 | 10-1 | 106 | 4 | 7 | 3 | 14 | 6 | 6 | 2 | 9 | 40 | 4 | 11 | 7 | 6 | 9.5 | 9.5 | 6.5 | 4 | 10 | 5 | 17.5 | 8.5 | 11.5 | 82 |
| 14 | 10-2 | 103 | 4 | 7 | 4 | 15 | 5 | 6 | 5 | 30 | 35 | 3 | 2 | 5 | 3 | 8.5 | 9.5 | 9.5 | 7 | 9 | 4.5 | 12 | 8 | 8 | 76 |
| 15 | 10-4 | 116 | 3 | 2 | 5 | 10 | 7 | 9 | 5 | 16 | 36 | 13 | 6 | 10 | 8 | 10.5 | 11.5 | 9.5 | 5 | 9 | 7.5 | 14.5 | 10 | 14 | 91.5 |
| 16 | 12-1 | 101 | 1 | 1 | 6 | 8 | 8 | 12 | 5 | 37 | 36 | 19 | 6 | 8 | 8 | 11 | 13.5 | 9.5 | 8 | 9 | 9 | 14.5 | 9 | 14 | 97.5 |
| 17 | 11-10 | 122 | 4 | 4 | 2 | 10 | 8 | 4 | 0 | 22 | 28 | 4 | 3 | 9 | 6 | 11 | 8 | 4.5 | 5.5 | 8 | 5 | 12.5 | 9.5 | 11.5 | 75.5 |
| 18 | 10-10 | 117 | 4 | 8 | 9 | 21 | 6 | 9 | 4 | 39 | 43 | 15 | 6 | 20 | 8 | 9.5 | 11.5 | 8.5 | 8 | 10.5 | 8 | 14.5 | 13.5 | 14 | 98 |
| 19 | 11-2 | 118 | 2 | 2 | 3 | 7 | 7 | 7 | 5 | 39 | 50 | 13 | 11 | 9 | 6 | 10.5 | 10 | 9.5 | 8 | 11.5 | 7.5 | 17.5 | 9.5 | 11.5 | 95.5 |
| 20 | 12-11 | 107 | 1 | 1 | 2 | 4 | 7 | 8 | 3 | 43 | 43 | 13 | 18 | 10 | 8 | 10.5 | 11 | 7.5 | 8.5 | 10.5 | 7.5 | 21.5 | 10 | 14 | 101 |
| 21 | 11-9 | 101 | 4 | 4 | 6 | 14 | 4 | 5 | 1 | 28 | 44 | 14 | 13 | 9 | 8 | 8 | 9 | 5.5 | 6.5 | 10.5 | 7.5 | 18.5 | 9.5 | 14 | 89 |
| 22 | 12-9 | 94 | 5 | 4 | 6 | 15 | 6 | 6 | 3 | 45 | 33 | 9 | 15 | 12 | 6 | 9.5 | 9.5 | 7.5 | 9 | 9 | 6 | 20 | 10.5 | 11.5 | 82.5 |
| 23 | 11-3 | 112 | 4 | 3 | 10 | 17 | 3 | 2 | 0 | 31 | 34 | 5 | 9 | 13 | 10 | 7 | 7 | 4.5 | 7 | 9 | 5 | 16 | 11 | 16.5 | 83 |
| 24 | 11-4 | 124 | 3 | 4 | 4 | 11 | 12 | 13 | 3 | 28 | 40 | 15 | 16 | 11 | 6 | 14 | 14 | 7.5 | 6.5 | 10 | 8 | 20.5 | 10 | 11.5 | 102 |
| 25 | 12-2 | 104 | 1 | 2 | 7 | 10 | 2 | 1 | 1 | 25 | 42 | 3 | 11 | 10 | 9 | 6.5 | 6 | 5.5 | 6 | 10 | 4.5 | 17.5 | 10 | 15.5 | 81.5 |
| 26 | 11-7 | 110 | 5 | 7 | 6 | 18 | 12 | 12 | 5 | 15 | 25 | 12 | 5 | 16 | 4 | 14 | 13.5 | 9.5 | 5 | 7.5 | 7 | 13.5 | 12 | 9.5 | 91.5 |
| 27 | 12-11 | 77 | 4 | 5 | 3 | 12 | 11 | 8 | 1 | 32 | 44 | 15 | 12 | 10 | 8 | 13.5 | 11 | 5.5 | 7 | 10.5 | 8 | 18 | 10 | 14 | 97.5 |
| 28 | 12-8 | 108 | 1 | 5 | 5 | 11 | 15 | 12 | 3 | 39 | 47 | 7 | 19 | 12 | 6 | 16.5 | 13.5 | 7.5 | 8 | 11 | 5.5 | 22 | 10.5 | 11.5 | 106 |
| 29 | 11-9 | 107 | 5 | 3 | 4 | 12 | 9 | 12 | 6 | 24 | 41 | 9 | 15 | 15 | 7 | 12 | 13.5 | 10.5 | 6 | 10 | 6 | 20 | 11.5 | 13 | 102.5 |
| 30 | 12-9 | 90 | 2 | 2 | 3 | 7 | 11 | 6 | 1 | 46 | 45 | 19 | 15 | 3 | 8 | 13.5 | 9.5 | 5.5 | 9 | 10.5 | 9 | 20 | 7 | 14 | 98 |
| 31 | 11-6 | 133 | 1 | 2 | 1 | 4 | 13 | 7 | 4 | 41 | 39 | 19 | 9 | 13 | 8 | 15 | 10 | 8.5 | 8.5 | 9.5 | 9 | 16 | 11 | 14 | 101.5 |
| 32 | 10 | 115 | 4 | 4 | 5 | 13 | 6 | 9 | 0 | 46 | 39 | 22 | 5 | 16 | 8 | 9.5 | 11.5 | 4.5 | 9 | 9.5 | 9.5 | 13.5 | 12 | 14 | 93 |
| 33 | 10 | 118 | 4 | 5 | 3 | 12 | 4 | 8 | 0 | 50 | 46 | 19 | 6 | 8 | 4 | 8 | 11 | 4.5 | 9.5 | 11 | 9 | 14.5 | 9 | 9.5 | 86 |
| 34 | 10-1 | 118 | 3 | 5 | 4 | 12 | 7 | 5 | 0 | 47 | 37 | 15 | 7 | 6 | 7 | 10.5 | 9 | 4.5 | 9 | 9.5 | 8 | 15 | 8.5 | 13 | 87 |
| 35 | 10-3 | 126 | 4 | 5 | 6 | 15 | 10 | 6 | 0 | 45 | 25 | 9 | 14 | 14 | 8 | 12.5 | 9.5 | 4.5 | 9 | 7.5 | 6 | 19 | 11.5 | 14 | 93.5 |
| 36 | 10-11 | 126 | 4 | 5 | 6 | 15 | 14 | 13 | 2 | 50 | 38 | 19 | 16 | 18 | 9 | 15.5 | 14 | 6.5 | 9.5 | 9.5 | 9 | 20.5 | 13 | 15.5 | 113 |
| 37 | 10-3 | 109 | 5 | 7 | 7 | 19 | 6 | 6 | 0 | 42 | 13 | 16 | 3 | 9 | 6 | 9.5 | 9.5 | 4.5 | 8.5 | 5.5 | 8 | 12.5 | 9.5 | 11.5 | 79 |

GENERAL PURPOSE TABLE (continued)

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro-ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | 10-9 | 100 | 4 | 3 | 8 | 15 | 7 | 3 | 6 | 50 | 48 | 18 | 8 | 14 | 5 | 10.5 | 7.5 | 10.5 | 9.5 | 11 | 8.5 | 15.5 | 11.5 | 10.5 | 95 |
| 39 | 10-7 | 115 | 2 | 1 | 2 | 5 | 3 | 6 | 3 | 39 | 27 | 6 | 21 | 10 | 7 | 7 | 9.5 | 7.5 | 8 | 8 | 5.5 | 23.5 | 10 | 13 | 92 |
| 40 | 9-11 | 121 | 1 | 2 | 3 | 6 | 10 | 4 | 4 | 50 | 45 | 20 | 17 | 20 | 9 | 12.5 | 8 | 8.5 | 9.5 | 10.5 | 9 | 21 | 13.5 | 15.5 | 108 |
| 41 | 10-7 | 100 | 5 | 5 | 4 | 14 | 9 | 6 | 3 | 45 | 32 | 13 | 11 | 7 | 3 | 12 | 9.5 | 7.5 | 9 | 8.5 | 7.5 | 17.5 | 8.5 | 8 | 88 |
| 42 | 10-4 | 115 | 4 | 5 | 6 | 15 | 5 | 3 | 1 | 37 | 43 | 22 | 10 | 7 | 8 | 8.5 | 7.5 | 5.5 | 8 | 10.5 | 9.5 | 16.5 | 8.5 | 14 | 88.5 |
| 43 | 11-7 | 109 | 1 | 1 | 3 | 5 | 9 | 8 | 2 | 32 | 52 | 14 | 15 | 8 | 5 | 12 | 11 | 6.5 | 7 | 12 | 7.5 | 20 | 9 | 10.5 | 95.5 |
| 44 | 10-5 | 112 | 2 | 1 | 5 | 8 | 13 | 8 | 2 | 46 | 34 | 10 | 17 | 13 | 6 | 15 | 11 | 6.5 | 9 | 9 | 6.5 | 21 | 11 | 11.5 | 100.5 |
| 45 | 10-4 | 104 | 1 | 2 | 4 | 7 | 9 | 14 | 2 | 35 | 29 | 9 | 18 | 20 | 10 | 12 | 15 | 6.5 | 7.5 | 8 | 6 | 21.5 | 13.5 | 16.5 | 106.5 |
| 46 | 11-0 | 95 | 4 | 4 | 2 | 10 | 6 | 5 | 3 | 41 | 39 | 22 | 10 | 4 | 5 | 9.5 | 9 | 7.5 | 8.5 | 9.5 | 9.5 | 16.5 | 7.5 | 10.5 | 88 |
| 47 | 10-3 | 120 | 4 | 5 | 5 | 14 | 12 | 11 | 5 | 47 | 37 | 8 | 18 | 10 | 7 | 14 | 13 | 9.5 | 9 | 9.5 | 6 | 21.5 | 10 | 13 | 105.5 |
| 48 | 10-3 | 109 | 5 | 7 | 10 | 22 | 3 | 3 | 1 | 49 | 35 | 16 | 16 | 6 | 7 | 7 | 7.5 | 5.5 | 9.5 | 9 | 8 | 20.5 | 8.5 | 13 | 88.5 |
| 49 | 10-5 | 139 | 1 | 1 | 4 | 6 | 9 | 9 | 2 | 56 | 46 | 19 | 21 | 19 | 9 | 12 | 11.5 | 6.5 | 10.5 | 11 | 9 | 23.5 | 13 | 15.5 | 112.5 |
| 50 | 11-8 | 104 | 4 | 4 | 7 | 15 | 7 | 10 | 3 | 53 | 34 | 21 | 12 | 6 | 6 | 10.5 | 12 | 7.5 | 10 | 9 | 9.5 | 18 | 8.5 | 11.5 | 96.5 |
| 51 | 10-4 | 102 | 3 | 4 | 3 | 10 | 11 | 9 | 0 | 37 | 44 | 4 | 17 | 2 | 7 | 13.5 | 11.5 | 4.5 | 8 | 10.5 | 5 | 21 | 7 | 13 | 94 |
| 52 | 10-11 | 109 | 3 | 3 | 6 | 12 | 10 | 5 | 0 | 50 | 33 | 17 | 0 | 8 | 3 | 12.5 | 9 | 4.5 | 9.5 | 9 | 8.5 | 10.5 | 9 | 8 | 80.5 |
| 53 | 10-1 | 119 | 4 | 5 | 6 | 15 | 10 | 4 | 5 | 65 | 42 | 20 | 8 | 6 | 4 | 12.5 | 8 | 9.5 | 11.5 | 10 | 9 | 15.5 | 8.5 | 9.5 | 94 |
| 54 | 10-8 | 101 | 3 | 1 | 5 | 9 | 6 | 4 | 0 | 52 | 48 | 20 | 17 | 6 | 8 | 9.5 | 8 | 4.5 | 10 | 11 | 9 | 21 | 8.5 | 14 | 95.5 |
| 55 | 10-1 | 109 | 5 | 7 | 8 | 20 | 8 | 5 | 0 | 43 | 22 | 18 | 8 | 1 | 9 | 11 | 9 | 4.5 | 8.5 | 7 | 8.5 | 15.5 | 6.5 | 15.5 | 86 |
| 56 | 10-4 | 116 | 3 | 2 | 3 | 8 | 4 | 5 | 0 | 63 | 48 | 11 | 9 | 5 | 8 | 8 | 9 | 4.5 | 11.5 | 11 | 7 | 16 | 8 | 14 | 89 |
| 57 | 11-2 | 147 | 4 | 5 | 6 | 15 | 8 | 9 | 3 | 56 | 30 | 11 | 19 | 10 | 7 | 11 | 11.5 | 7.5 | 10.5 | 8.5 | 7 | 22 | 10 | 13 | 101 |
| 58 | 10-11 | 101 | 2 | 1 | 1 | 4 | 12 | 5 | 0 | 66 | 46 | 14 | 17 | 4 | 8 | 14 | 9 | 4.5 | 12. | 11 | 7.5 | 21 | 7.5 | 14 | 100.5 |
| 59 | 11-2 | 98 | 5 | 3 | 5 | 13 | 8 | 9 | 0 | 31 | 31 | 14 | 18 | 4 | 6 | 11 | 11.5 | 4.5 | 7 | 8.5 | 7.5 | 21.5 | 7.5 | 11.5 | 90.5 |
| 60 | 10-1 | 112 | 3 | 2 | 3 | 8 | 3 | 5 | 0 | 37 | 41 | 22 | 17 | 6 | 2 | 7 | 9 | 4.5 | 8 | 10 | 9.5 | 21 | 8.5 | 7 | 84.5 |
| 61 | 10-10 | 113 | 2 | 5 | 3 | 10 | 6 | 10 | 4 | 25 | 49 | 7 | 7 | 9 | 9 | 9.5 | 12 | 8.5 | 6 | 11.5 | 5.5 | 15 | 9.5 | 13 | 90.5 |
| 62 | 10-3 | 127 | 4 | 3 | 5 | 12 | 9 | 11 | 4 | 33 | 32 | 16 | 20 | 8 | 8 | 12 | 13 | 8.5 | 7.5 | 8.5 | 8 | 23 | 9 | 14 | 103.5 |
| 63 | 10-8 | 97 | 2 | 1 | 4 | 7 | 8 | 2 | 0 | 40 | 37 | 16 | 8 | 7 | 8 | 11 | 7 | 4.5 | 8 | 9.5 | 8 | 15.5 | 8.5 | 14 | 85.5 |
| 64 | 10-10 | 109 | 6 | 8 | 4 | 18 | 7 | 5 | 0 | 17 | 5 | 6 | 2 | 2 | 1 | 10.5 | 9 | 4.5 | 5 | 4.5 | 5.5 | 12 | 7 | 5.5 | 63.5 |
| 65 | 10-5 | 125 | 4 | 4 | 4 | 16 | 8 | 5 | 5 | 24 | 31 | 5 | 3 | 4 | 7 | 11 | 9 | 9.5 | 6 | 8.5 | 5 | 12.5 | 7.5 | 13 | 82 |
| 66 | 10-5 | 119 | 4 | 3 | 3 | 10 | 7 | 6 | 0 | 25 | 40 | 8 | 6 | 9 | 5 | 10.5 | 9.5 | 4.5 | 6 | 10 | 6 | 14.5 | 9.5 | 10.5 | 81 |
| 67 | 10-8 | 121 | 5 | 4 | 1 | 10 | 10 | 8 | 0 | 24 | 13 | 12 | 4 | 2 | 4 | 12.5 | 11 | 4.5 | 6 | 5.5 | 7 | 13 | 7 | 9.5 | 76 |
| 68 | 10-9 | 100 | 5 | 7 | 3 | 15 | 5 | 3 | 0 | 24 | 36 | 13 | 6 | 9 | 3 | 8.5 | 7.5 | 4.5 | 6 | 9 | 7.5 | 14.5 | 9.5 | 8 | 75 |
| 69 | 10-8 | 141 | 1 | 1 | 1 | 3 | 13 | 9 | 9 | 29 | 44 | 10 | 21 | 13 | 7 | 15 | 11.5 | 13.5 | 6.5 | 10.5 | 6.5 | 23.5 | 11 | 13 | 111 |
| 70 | 10-6 | 109 | 4 | 7 | 7 | 18 | 10 | 4 | 1 | 38 | 0 | 15 | 5 | 1 | 7 | 12.5 | 8 | 5.5 | 8 | 3.5 | 8 | 13.5 | 6.5 | 13 | 78.5 |
| 71 | 11-2 | 114 | 4 | 5 | 8 | 17 | 3 | 1 | 3 | 24 | 35 | 9 | 11 | 8 | 4 | 7.0 | 6 | 7.5 | 6 | 9 | 6 | 17.5 | 9 | 9.5 | 77.5 |
| 72 | 12-1 | 100 | 4 | 7 | 7 | 18 | 12 | 9 | 6 | 20 | 34 | 9 | 7 | 12 | 6 | 14 | 11.5 | 10.5 | 5.5 | 9 | 6 | 15 | 10.5 | 11.5 | 93.5 |
| 73 | 12-5 | 112 | 5 | 5 | 6 | 16 | 5 | 7 | 0 | 43 | 42 | 17 | 4 | 9 | 8 | 8.5 | 10 | 4.5 | 8.5 | 10 | 8.5 | 13 | 9.5 | 14 | 86.5 |
| 74 | 10-10 | 121 | 3 | 3 | 5 | 11 | 7 | 6 | 2 | 21 | 0 | 11 | 9 | 11 | 6 | 10.5 | 9.5 | 6.5 | 5.5 | 3.5 | 7 | 16 | 10 | 11.5 | 80 |
| 75 | 11-4 | 108 | 4 | 7 | 6 | 17 | 4 | 6 | 2 | 30 | 37 | 8 | 4 | 14 | 7 | 8 | 9.5 | 6.5 | 7 | 9.5 | 6 | 13 | 11.5 | 13 | 84 |

GENERAL PURPOSE TABLE (continued)

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Project | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | 10-9 | 100 | 4 | 3 | 8 | 15 | 7 | 3 | 6 | 50 | 48 | 18 | 8 | 14 | 5 | 10.5 | 7.5 | 10.5 | 9.5 | 11 | 8.5 | 15.5 | 11.5 | 10.5 | 95 |
| 39 | 10-7 | 115 | 2 | 1 | 2 | 5 | 3 | 6 | 3 | 39 | 27 | 6 | 21 | 10 | 7 | 7 | 9.5 | 7.5 | 8 | 8 | 5.5 | 23.5 | 10 | 13 | 92 |
| 40 | 9-11 | 121 | 1 | 2 | 3 | 6 | 10 | 4 | 4 | 50 | 45 | 20 | 17 | 20 | 9 | 12.5 | 8 | 8.5 | 9.5 | 10.5 | 9 | 21 | 13.5 | 15.5 | 108 |
| 41 | 10-7 | 100 | 5 | 5 | 4 | 14 | 9 | 6 | 3 | 45 | 32 | 13 | 11 | 7 | 3 | 12 | 9.5 | 7.5 | 9 | 8.5 | 7.5 | 17.5 | 8.5 | 8 | 88 |
| 42 | 10-4 | 115 | 4 | 5 | 6 | 15 | 5 | 3 | 1 | 37 | 43 | 22 | 10 | 7 | 8 | 8.5 | 7.5 | 5.5 | 8 | 10.5 | 9.5 | 16.5 | 8.5 | 14 | 88.5 |
| 43 | 11-7 | 109 | 1 | 1 | 3 | 5 | 9 | 8 | 2 | 32 | 52 | 14 | 15 | 8 | 5 | 12 | 11 | 6.5 | 7 | 12 | 7.5 | 20 | 9 | 10.5 | 95.5 |
| 44 | 10-5 | 112 | 2 | 1 | 5 | 8 | 13 | 8 | 2 | 46 | 34 | 10 | 17 | 13 | 6 | 15 | 11 | 6.5 | 9 | 9 | 6.5 | 21 | 11 | 11.5 | 100.5 |
| 45 | 10-4 | 104 | 1 | 2 | 4 | 7 | 9 | 14 | 2 | 35 | 29 | 9 | 18 | 20 | 10 | 12 | 15 | 6.5 | 7.5 | 8 | 6 | 21.5 | 13.5 | 16.5 | 106.5 |
| 46 | 11-0 | 95 | 4 | 4 | 2 | 10 | 6 | 5 | 3 | 41 | 39 | 22 | 10 | 4 | 5 | 9.5 | 9 | 7.5 | 8.5 | 9.5 | 9.5 | 16.5 | 7.5 | 10.5 | 88 |
| 47 | 10-3 | 120 | 4 | 5 | 5 | 14 | 12 | 11 | 5 | 47 | 37 | 8 | 18 | 10 | 7 | 14 | 13 | 9.5 | 9 | 9.5 | 6 | 21.5 | 10 | 13 | 105.5 |
| 48 | 10-3 | 109 | 5 | 7 | 10 | 22 | 3 | 3 | 1 | 49 | 35 | 16 | 16 | 6 | 7 | 7 | 7.5 | 5.5 | 9.5 | 9 | 8 | 20.5 | 8.5 | 13 | 88.5 |
| 49 | 10-5 | 139 | 1 | 1 | 4 | 6 | 9 | 9 | 2 | 56 | 46 | 19 | 21 | 19 | 9 | 12 | 11.5 | 6.5 | 10.5 | 11 | 9 | 23.5 | 13 | 15.5 | 112.5 |
| 50 | 11-8 | 104 | 4 | 4 | 7 | 15 | 7 | 10 | 3 | 53 | 34 | 21 | 12 | 6 | 6 | 10.5 | 12 | 7.5 | 10 | 9 | 9.5 | 18 | 8.5 | 11.5 | 96.5 |
| 51 | 10-4 | 102 | 3 | 4 | 3 | 10 | 11 | 9 | 0 | 37 | 44 | 4 | 17 | 2 | 7 | 13.5 | 11.5 | 4.5 | 8 | 10.5 | 5 | 21 | 7 | 13 | 94 |
| 52 | 10-11 | 109 | 3 | 3 | 6 | 12 | 10 | 5 | 0 | 50 | 33 | 17 | 0 | 8 | 3 | 12.5 | 9 | 4.5 | 9.5 | 9 | 8.5 | 10.5 | 9 | 8 | 80.5 |
| 53 | 10-1 | 119 | 4 | 5 | 6 | 15 | 10 | 4 | 5 | 65 | 42 | 20 | 8 | 6 | 4 | 12.5 | 8 | 9.5 | 11.5 | 10 | 9 | 15.5 | 8.5 | 9.5 | 94 |
| 54 | 10-8 | 101 | 3 | 1 | 5 | 9 | 6 | 4 | 0 | 52 | 48 | 20 | 17 | 6 | 8 | 9.5 | 8 | 4.5 | 10 | 11 | 9 | 21 | 8.5 | 14 | 95.5 |
| 55 | 10-1 | 109 | 5 | 7 | 8 | 20 | 8 | 5 | 0 | 43 | 22 | 18 | 8 | 1 | 9 | 11 | 9 | 4.5 | 8.5 | 7 | 8.5 | 15.5 | 6.5 | 15.5 | 86 |
| 56 | 10-4 | 116 | 3 | 2 | 3 | 8 | 4 | 5 | 0 | 63 | 48 | 11 | 9 | 5 | 8 | 8 | 9 | 4.5 | 11.5 | 11 | 7 | 16 | 8 | 14 | 89 |
| 57 | 11-2 | 147 | 4 | 5 | 6 | 15 | 8 | 9 | 3 | 56 | 30 | 11 | 19 | 10 | 7 | 11 | 11.5 | 7.5 | 10.5 | 8.5 | 7 | 22 | 10 | 13 | 101 |
| 58 | 10-11 | 101 | 2 | 1 | 1 | 4 | 12 | 5 | 0 | 66 | 46 | 14 | 17 | 4 | 8 | 14 | 9 | 4.5 | 12. | 11 | 7.5 | 21 | 7.5 | 14 | 100.5 |
| 59 | 11-2 | 98 | 5 | 3 | 5 | 13 | 8 | 9 | 0 | 31 | 31 | 14 | 18 | 4 | 6 | 11 | 11.5 | 4.5 | 7 | 8.5 | 7.5 | 21.5 | 7.5 | 11.5 | 90.5 |
| 60 | 10-1 | 112 | 3 | 2 | 3 | 8 | 3 | 5 | 0 | 37 | 41 | 22 | 17 | 6 | 2 | 7 | 9 | 4.5 | 8 | 10 | 9.5 | 21 | 8.5 | 7 | 84.5 |
| 61 | 10-10 | 113 | 2 | 5 | 3 | 10 | 6 | 10 | 4 | 25 | 49 | 7 | 7 | 9 | 9 | 9.5 | 12 | 8.5 | 6 | 11.5 | 5.5 | 15 | 9.5 | 13 | 90.5 |
| 62 | 10-3 | 127 | 4 | 3 | 5 | 12 | 9 | 11 | 4 | 33 | 32 | 16 | 20 | 8 | 8 | 12 | 13 | 8.5 | 7.5 | 8.5 | 8 | 23 | 9 | 14 | 103.5 |
| 63 | 10-8 | 97 | 2 | 1 | 4 | 7 | 8 | 2 | 0 | 40 | 37 | 16 | 8 | 7 | 8 | 11 | 7 | 4.5 | 8 | 9.5 | 8 | 15.5 | 8.5 | 14 | 85.5 |
| 64 | 10-10 | 109 | 6 | 8 | 4 | 18 | 7 | 5 | 0 | 17 | 5 | 6 | 2 | 2 | 1 | 10.5 | 9 | 4.5 | 5 | 4.5 | 5.5 | 12 | 7 | 5.5 | 63.5 |
| 65 | 10-5 | 125 | 4 | 4 | 4 | 16 | 8 | 5 | 5 | 24 | 31 | 5 | 3 | 4 | 7 | 11 | 9 | 9.5 | 6 | 8.5 | 5 | 12.5 | 7.5 | 13 | 82 |
| 66 | 10-5 | 119 | 4 | 3 | 3 | 10 | 7 | 6 | 0 | 25 | 40 | 8 | 6 | 9 | 5 | 10.5 | 9.5 | 4.5 | 6 | 10 | 6 | 14.5 | 9.5 | 10.5 | 81 |
| 67 | 10-8 | 121 | 5 | 4 | 1 | 10 | 10 | 8 | 0 | 24 | 13 | 12 | 4 | 2 | 4 | 12.5 | 11 | 4.5 | 6 | 5.5 | 7· | 13 | 7 | 9.5 | 76 |
| 68 | 10-9 | 100 | 5 | 7 | 3 | 15 | 5 | 3 | 0 | 24 | 36 | 13 | 6 | 9 | 3 | 8.5 | 7.5 | 4.5 | 6 | 9 | 7.5 | 14.5 | 9.5 | 8 | 75 |
| 69 | 10-8 | 141 | 1 | 1 | 1 | 3 | 13 | 9 | 9 | 29 | 44 | 10 | 21 | 13 | 7 | 15 | 11.5 | 13.5 | 6.5 | 10.5 | 6.5 | 23.5 | 11 | 13 | 111 |
| 70 | 10-6 | 109 | 4 | 7 | 7 | 18 | 10 | 4 | 1 | 38 | 0 | 15 | 5 | 1 | 7 | 12.5 | 8 | 5.5 | 8 | 3.5 | 8 | 13.5 | 6.5 | 13 | 78.5 |
| 71 | 11-2 | 114 | 4 | 5 | 8 | 17 | 3 | 1 | 3 | 24 | 35 | 9 | 11 | 8 | 4 | 7.0 | 6 | 7.5 | 6 | 9 | 6 | 17.5 | 9 | 9.5 | 77.5 |
| 72 | 12-1 | 100 | 4 | 7 | 7 | 18 | 12 | 9 | 6 | 20 | 34 | 9 | 7 | 12 | 6 | 14 | 11.5 | 10.5 | 5.5 | 9 | 6 | 15 | 10.5 | 11.5 | 93.1 |
| 73 | 12-5 | 112 | 5 | 5 | 6 | 16 | 5 | 7 | 0 | 43 | 42 | 17 | 4 | 9 | 8 | 8.5 | 10 | 4.5 | 8.5 | 10 | 8.5 | 13 | 9.5 | 14 | 86.5 |
| 74 | 10-10 | 121 | 3 | 3 | 5 | 11 | 7 | 6 | 2 | 21 | 0 | 11 | 9 | 11 | 6 | 10.5 | 9.5 | 6.5 | 5.5 | 3.5 | 7 | 16 | 10 | 11.5 | 80 |
| 75 | 11-4 | 108 | 4 | 7 | 6 | 17 | 4 | 6 | 2 | 30 | 37 | 8 | 4 | 14 | 7 | 8 | 9.5 | 6.5 | 7 | 9.5 | 6 | 13 | 11.5 | 13 | 84 |

GENERAL PURPOSE TABLE (continued)

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro-ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | 11-3 | 107 | 2 | 2 | 4 | 8 | 8 | 3 | 0 | 41 | 39 | 16 | 3 | 8 | 5 | 11 | 7.5 | 4.5 | 8.5 | 9.5 | 8 | 12.5 | 9 | 10.5 | 81 |
| 77 | 11-8 | 106 | 2 | 5 | 7 | 14 | 4 | 8 | 0 | 37 | 48 | 8 | 3 | 9 | 6 | 8 | 11 | 4.5 | 8 | 11 | 6 | 12.5 | 9.5 | 11.5 | 82 |
| 78 | 11-8 | 130 | 4 | 5 | 5 | 14 | 6 | 9 | 0 | 37 | 34 | 15 | 11 | 12 | 8 | 9.5 | 11.5 | 4.5 | 8 | 9 | 8 | 17.5 | 10.5 | 14 | 92.5 |
| 79 | 11-7 | 101 | 3 | 4 | 5 | 12 | 9 | 9 | 3 | 43 | 0 | 3 | 10 | 7 | 8 | 12 | 11.5 | 7.5 | 8.5 | 3.5 | 4.5 | 16.5 | 8.5 | 14 | 76.5 |
| 80 | 11-9 | 99 | 4 | 4 | 6 | 14 | 3 | 3 | 5 | 0 | 45 | 18 | 2 | 13 | 6 | 7 | 7.5 | 9.5 | 2.5 | 10.5 | 8.5 | 12 | 11 | 11.5 | 80 |
| 81 | 11-4 | 118 | 2 | 2 | 4 | 8 | 3 | 5 | 3 | 30 | 0 | 13 | 13 | 13 | 6 | 7 | 9 | 7.5 | 7 | 3.5 | 7.5 | 18.5 | 11 | 11.5 | 82.5 |
| 82 | 11-2 | 128 | 2 | 5 | 3 | 10 | 7 | 9 | 3 | 31 | 38 | 12 | 17 | 18 | 8 | 10.5 | 11.5 | 7.5 | 7 | 9.5 | 7 | 21 | 13 | 14 | 101 |
| 83 | 11-9 | 100 | 4 | 1 | 3 | 8 | 5 | 5 | 1 | 44 | 0 | 19 | 6 | 8 | 6 | 8.5 | 9 | 5.5 | 9 | 3.5 | 9 | 14.5 | 9 | 11.5 | 79.5 |
| 84 | 11-7 | 107 | 1 | 2 | 2 | 5 | 8 | 4 | 2 | 46 | 47 | 12 | 14 | 5 | 8 | 11 | 8 | 6.5 | 9 | 11 | 7 | 19 | 8 | 14 | 93.5 |
| 85 | 11-3 | 124 | 2 | 4 | 5 | 11 | 8 | 10 | 3 | 35 | 42 | 17 | 21 | 20 | 10 | 11 | 12 | 7.5 | 7.5 | 10 | 8.5 | 23.5 | 13.5 | 16.5 | 110 |
| 86 | 9-11 | 123 | 4 | 1 | 5 | 10 | 7 | 7 | 1 | 21 | 30 | 4 | 9 | 8 | 4 | 10.5 | 10 | 5.5 | 5.5 | 8.5 | 5 | 16 | 9 | 9.5 | 79.5 |
| 87 | 10-0 | 116 | 4 | 5 | 4 | 13 | 5 | 3 | 2 | 32 | 46 | 17 | 16 | 20 | 8 | 8.5 | 7.5 | 6.5 | 7 | 11 | 8.5 | 20.5 | 13.5 | 14 | 97 |
| 88 | 10-8 | 123 | 4 | 3 | 2 | 9 | 13 | 7 | 0 | 27 | 41 | 9 | 5 | 9 | 6 | 15 | 10 | 4.5 | 6.5 | 10 | 6 | 13.5 | 9.5 | 11.5 | 86.5 |
| 89 | 11-11 | 94 | 4 | 2 | 2 | 8 | 4 | 5 | 3 | 25 | 45 | 10 | 21 | 10 | 7 | 8 | 9 | 7.5 | 6 | 10.5 | 6.5 | 23.5 | 10 | 13 | 94 |
| 90 | 9-11 | 124 | 4 | 4 | 2 | 10 | 8 | 11 | 5 | 30 | 44 | 9 | 13 | 8 | 6 | 11 | 13 | 9.5 | 7 | 10.5 | 6 | 18.5 | 9 | 11.5 | 96 |
| 91 | 11-0 | 120 | 1 | 1 | 1 | 3 | 4 | 5 | 1 | 59 | 47 | 27 | 19 | 13 | 6 | 8 | 9 | 5.5 | 11 | 11 | 11 | 22 | 11 | 11.5 | 100 |
| 92 | 10-9 | 117 | 1 | 1 | 3 | 5 | 13 | 11 | 6 | 39 | 48 | 14 | 18 | 18 | 8 | 15 | 13 | 10.5 | 8 | 11 | 7.5 | 21.5 | 13 | 14 | 113.5 |
| 93 | 10-1 | 116 | 4 | 4 | 3 | 11 | 4 | 0 | 0 | 32 | 50 | 19 | 8 | 12 | 7 | 8 | 5.5 | 4.5 | 7 | 11.5 | 9 | 15.5 | 10.5 | 13 | 84.5 |
| 94 | 11-9 | 104 | 1 | 1 | 2 | 4 | 11 | 6 | 1 | 45 | 51 | 12 | 9 | 5 | 7 | 13.5 | 9.5 | 5.5 | 9 | 11.5 | 7 | 16 | 8 | 13 | 93 |
| 95 | 11-9 | 113 | 1 | 2 | 1 | 4 | 14 | 10 | 1 | 49 | 43 | 1 | 9 | 7 | 6 | 15.5 | 12 | 5.5 | 9.5 | 10.5 | 4 | 16 | 8.5 | 11.5 | 93 |
| 96 | 10-11 | 85 | 4 | 3 | 5 | 12 | 4 | 5 | 1 | 37 | 39 | 14 | 4 | 4 | 2 | 8 | 9 | 5.5 | 8 | 9.5 | 7.5 | 13 | 7.5 | 7 | 75 |
| 97 | 10-6 | 79 | 4 | 7 | 4 | 15 | 6 | 4 | 0 | 31 | 42 | 7 | 7 | 5 | 2 | 9.5 | 8 | 4.5 | 7 | 10 | 5.5 | 15 | 8 | 7 | 74.5 |
| 98 | 10-9 | 100 | 4 | 2 | 3 | 9 | 9 | 6 | 3 | 31 | 37 | 13 | 10 | 15 | 7 | 12 | 9.5 | 7.5 | 7 | 9.5 | 7.5 | 16.5 | 11.5 | 13 | 94 |
| 99 | 9-10 | 147 | 1 | 2 | 5 | 8 | 3 | 6 | 0 | 30 | 45 | 11 | 6 | 13 | 6 | 7 | 9.5 | 4.5 | 7 | 10.5 | 7 | 14.5 | 11 | 11.5 | 82.5 |
| 100 | 10-11 | 114 | 4 | 4 | 6 | 14 | 10 | 6 | 3 | 38 | 47 | 22 | 7 | 4 | 6 | 12.5 | 9.5 | 7.5 | 8 | 11 | 9.5 | 15 | 7.5 | 11.5 | 92 |
| 101 | 11-7 | 106 | 4 | 5 | 4 | 13 | 12 | 6 | 3 | 37 | 41 | 14 | 15 | 5 | 7 | 14 | 9.5 | 7.5 | 8 | 10.0 | 7.5 | 20 | 8 | 13 | 97.5 |
| 102 | 9-10 | 112 | 4 | 7 | 7 | 18 | 9 | 5 | 0 | 17 | 37 | 10 | 3 | 3 | 6 | 12 | 9 | 4.5 | 5 | 9.5 | 6.5 | 12.5 | 7 | 11.5 | 77.5 |
| 103 | 10-4 | 101 | 4 | 7 | 8 | 19 | 8 | 3 | 1 | 25 | 47 | 21 | 16 | 13 | 7 | 11 | 7.5 | 5.5 | 6 | 11 | 9.5 | 20.5 | 11 | 13 | 95 |
| 104 | 11-3 | 119 | 1 | 1 | 3 | 5 | 16 | 11 | 5 | 43 | 47 | 13 | 10 | 8 | 9 | 17 | 13 | 9.5 | 8.5 | 11 | 7.5 | 16.5 | 9 | 15.5 | 108 |
| 105 | 9-11 | 116 | 4 | 5 | 3 | 12 | 3 | 5 | 0 | 31 | 4 | 12 | 6 | 9 | 8 | 7 | 9 | 4.5 | 7 | 4 | 7 | 14.5 | 9.5 | 14 | 76.5 |
| 106 | 9-1 | 153 | 4 | 2 | 3 | 9 | 12 | 10 | 3 | 35 | 50 | 13 | 20 | 16 | 8 | 14 | 12 | 7.5 | 7.5 | 11.5 | 7.5 | 23 | 12 | 14 | 109 |
| 107 | 10-6 | 113 | 4 | 7 | 6 | 17 | 10 | 6 | 0 | 35 | 38 | 12 | 7 | 7 | 2 | 12.5 | 9.5 | 4.5 | 7.5 | 9.5 | 7 | 15 | 8.5 | 7 | 81 |
| 108 | 12-5 | 81 | 4 | 8 | 7 | 19 | 6 | 4 | 0 | 23 | 39 | 11 | 1 | 1 | 1 | 9.5 | 8 | 4.5 | 6 | 9.5 | 7 | 11 | 6.5 | 5.5 | 67.5 |
| 109 | 10-2 | 103 | 4 | 3 | 5 | 12 | 10 | 8 | 0 | 36 | 38 | 11 | 0 | 4 | 9 | 12.5 | 11 | 4.5 | 7.5 | 9.5 | 7 | 10.5 | 7.5 | 15.5 | 85.5 |
| 110 | 10-6 | 106 | 4 | 4 | 5 | 13 | 6 | 7 | 4 | 25 | 46 | 18 | 17 | 13 | 7 | 9.5 | 10 | 8.5 | 6 | 11 | 8.5 | 21 | 11 | 13 | 98.5 |
| 111 | 10-9 | 107 | 4 | 4 | 4 | 12 | 7 | 7 | 1 | 38 | 44 | 13 | 7 | 9 | 7 | 10.5 | 10 | 5.5 | 8 | 10.5 | 7.5 | 15 | 9.5 | 13 | 89.5 |
| 112 | 12-3 | 91 | 4 | 5 | 5 | 14 | 4 | 7 | 0 | 34 | 46 | 13 | 1 | 4 | 4 | 8 | 10 | 4.5 | 7.5 | 11 | 7.5 | 11 | 7.5 | 9.5 | 76.5 |
| 113 | 10-6 | 125 | 1 | 2 | 3 | 6 | 9 | 6 | 3 | 29 | 48 | 13 | 20 | 9 | 7 | 12 | 9.5 | 7.5 | 6.5 | 11 | 7.5 | 23 | 9.5 | 13 | 99.5 |

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 114 | 11-2 | 100 | 1 | 5 | 3 | 9 | 6 | 3 | 0 | 56 | 46 | 15 | 11 | 12 | 8 |
| 115 | 10-3 | 100 | 1 | 3 | 2 | 6 | 7 | 5 | 5 | 31 | 53 | 11 | 21 | 19 | 7 |
| 116 | 10-5 | 126 | 4 | 5 | 2 | 11 | 8 | 9 | 1 | 28 | 44 | 15 | 21 | 15 | 7 |
| 117 | 14-10 | 97 | 4 | 4 | 4 | 12 | 8 | 3 | 4 | 43 | 49 | 12 | 10 | 12 | 9 |
| 118 | 10-10 | 106 | 4 | 4 | 10 | 18 | 8 | 3 | 0 | 31 | 42 | 18 | 18 | 10 | 7 |
| 119 | 13-1 | 96 | 1 | 1 | 2 | 4 | 7 | 4 | 4 | 48 | 1 | 23 | 6 | 5 | 4 |
| 120 | 13-4 | 102 | 1 | 1 | 5 | 7 | 3 | 3 | 1 | 35 | 19 | 5 | 5 | 5 | 4 |
| 121 | 11-10 | 107 | 6 | 7 | 10 | 23 | 6 | 3 | 0 | 30 | 39 | 4 | 6 | 6 | 4 |
| 122 | 11-5 | 113 | 1 | 1 | 2 | 4 | 8 | 8 | 4 | 35 | 54 | 21 | 18 | 16 | 9 |
| 123 | 12-2 | 94 | 4 | 5 | 6 | 15 | 8 | 6 | 0 | 44 | 40 | 10 | 7 | 5 | 6 |
| 124 | 11-11 | 116 | 4 | 4 | 2 | 10 | 12 | 9 | 2 | 27 | 37 | 18 | 1 | 2 | 6 |
| 125 | 11-2 | 110 | 4 | 4 | 10 | 18 | 11 | 3 | 2 | 31 | 46 | 11 | 5 | 10 | 8 |
| 126 | 11-6 | 128 | 4 | 1 | 3 | 8 | 12 | 12 | 3 | 18 | 49 | 16 | 17 | 2 | 6 |
| 127 | 11-8 | 117 | 1 | 4 | 3 | 8 | 8 | 6 | 1 | 24 | 52 | 10 | 20 | 12 | .9 |
| 128 | 13-1 | 98 | 4 | 4 | 4 | 12 | 5 | 4 | 2 | 29 | 36 | 8 | 9 | 9 | .6 |
| 129 | 11-4 | 111 | 4 | 7 | 5 | 16 | 7 | 4 | 0 | 33 | 38 | 9 | 18 | 9 | 8 |
| 130 | 13-9 | 93 | 1 | 1 | 4 | 6 | 15 | 11 | 5 | 33 | 49 | 9 | 21 | 8 | 7 |
| 131 | 12-1 | 101 | 4 | 7 | 2 | 13 | 12 | 10 | 4 | 49 | 43 | 16 | 7 | 18 | 10 |
| 132 | 12-6 | 99 | 4 | 4 | 5 | 13 | 10 | 8 | 2 | 24 | 34 | 11 | 14 | 4 | 7 |
| 133 | 12-4 | 105 | 4 | 1 | 2 | 7 | 5 | 8 | 2 | 33 | 48 | 17 | 0 | 7 | 7 |
| 134 | 10-11 | 111 | 4 | 4 | 5 | 13 | 1 | 2 | 3 | 44 | 45 | 13 | 7 | 7 | 8 |
| 135 | 10-7 | 117 | 4 | 4 | 3 | 11 | 5 | 7 | 2 | 29 | 43 | 2 | 15 | 8 | 8 |
| 136 | 11-6 | 113 | 1 | 1 | 4 | 6 | 9 | 9 | 2 | 32 | 49 | 19 | 21 | 5 | 8 |
| 137 | 11-2 | 129 | 4 | 4 | 5 | 13 | 10 | 5 | 2 | 26 | 42 | 15 | 9 | 9 | 9 |
| 138 | 13-1 | 106 | 1 | 4 | 4 | 9 | 6 | 9 | 1 | 39 | 37 | 7 | 19 | 7 | 6 |
| 139 | 11-4 | 135 | 1 | 2 | 4 | 7 | 4 | 5 | 5 | 38 | 50 | 8 | 17 | 5 | 6 |
| 140 | 11-1 | 134 | 4 | 2 | 5 | 11 | 9 | 7 | 4 | 34 | 42 | 11 | 19 | 18 | 5 |
| 141 | 11-0 | 118 | 4 | 7 | 2 | 13 | 10 | 9 | 2 | 20 | 47 | 11 | 17 | 10 | 6 |
| 142 | 11-6 | 120 | 4 | 5 | 7 | 16 | 9 | 3 | 3 | 28 | 43 | 4 | 8 | 3 | 5 |
| 143 | 10-5 | 112 | 5 | 5 | 4 | 14 | 6 | 5 | 1 | 22 | 33 | 4 | 14 | 8 | 6 |
| 144 | 11-9 | 80 | 5 | 4 | 6 | 15 | 8 | 7 | 2 | 15 | 44 | 18 | 3 | 3 | 0 |
| 145 | 10-11 | 110 | 1 | 1 | 4 | 6 | 9 | 11 | 1 | 31 | 38 | 9 | 8 | 3 | 5 |
| 146 | 10-6 | 126 | 2 | 5 | 5 | 12 | 13 | 8 | 6 | 40 | 38 | 8 | 12 | 14 | 7 |
| 147 | 10-9 | 103 | 5 | 7 | 4 | 16 | 4 | 5 | 0 | 21 | 34 | 19 | 11 | 7 | 3 |
| 148 | 10-7 | 109 | 3 | 3 | 4 | 10 | 10 | 6 | 2 | 20 | 27 | 12 | 4 | 5 | 2 |
| 149 | 10-9 | 104 | 3 | 3 | 9 | 15 | 6 | 4 | 0 | 46 | 38 | 26 | 16 | 19 | 5 |
| 150 | 10-2 | 118 | 4 | 5 | 5 | 14 | 5 | 2 | 2 | 36 | 33 | 6 | 17 | 6 | 5 |

| I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|
| 9.5 | 7.5 | 4.5 | 10.5 | 11 | 8 | 17.5 | 10.5 | 14 | 93 |
| 10.5 | 9 | 9.5 | 7 | 12 | 7 | 23.5 | 13 | 13 | 104.5 |
| 11 | 11.5 | 5.5 | 6.5 | 10.5 | 8 | 23.5 | 11.5 | 13 | 101 |
| 11 | 7.5 | 8.5 | 8.5 | 11.5 | 7 | 16.5 | 10.5 | 15.5 | 96.5 |
| 11 | 7.5 | 4.5 | 7 | 10 | 8.5 | 21.5 | 10 | 13 | 93 |
| 10.5 | 8 | 8.5 | 9.5 | 3.5 | 10 | 14.5 | 8 | 9.5 | 81.5 |
| 7 | 7.5 | 5.5 | 7.5 | 6.5 | 5 | 13.5 | 8 | 9.5 | 70 |
| 9.5 | 7.5 | 4.5 | 7 | 9.5 | 5 | 14.5 | 8.5 | 9.5 | 75.5 |
| 11 | 11 | 8.5 | 7.5 | 12 | 9.5 | 21.5 | 12 | 15.5 | 108.5 |
| 11 | 9.5 | 4.5 | 9 | 10 | 6.5 | 15 | 8 | 11.5 | 85 |
| 14 | 11.5 | 6.5 | 6.5 | 9.5 | 8.5 | 11 | 7 | 11.5 | 86 |
| 13.5 | 7.5 | 6.5 | 7 | 11 | 7 | 13.5 | 10 | 14 | 90 |
| 14 | 13.5 | 7.5 | 5 | 11.5 | 8 | 21 | 7 | 11.5 | 99 |
| 11 | 9.5 | 5.5 | 6 | 12 | 6.5 | 23 | 10.5 | 15.5 | 89.5 |
| 8.5 | 8 | 6.5 | 6.5 | 9 | 6 | 16 | 9.5 | 11.5 | 81.5 |
| 10.5 | 8 | 4.5 | 7.5 | 9.5 | 6 | 21.5 | 9.5 | 14 | 91 |
| 16.5 | 13 | 9.5 | 7.5 | 11.5 | 6 | 23.5 | 9 | 13 | 109.5 |
| 14 | 12 | 8.5 | 9.5 | 10.5 | 8 | 15 | 13 | 16.5 | 107 |
| 12.5 | 11 | 6.5 | 6 | 9 | 7 | 19 | 7.5 | 13 | 91.5 |
| 8.5 | 11 | 6.5 | 7.5 | 11 | 8.5 | 10.5 | 8.5 | 13 | 85 |
| 5.5 | 7 | 7.5 | 9 | 10.5 | 7.5 | 15 | 8.5 | 14 | 84.5 |
| 8.5 | 10 | 6.5 | 6.5 | 10.5 | 4.5 | 20 | 9 | 14 | 89.5 |
| 12 | 11.5 | 6.5 | 7 | 11.5 | 9 | 23.5 | 8 | 14 | 103 |
| 12.5 | 9 | 6.5 | 6.5 | 10 | 8 | 16 | 9.5 | 15.5 | 93.5 |
| 9.5 | 11.5 | 5.5 | 8 | 9.5 | 5.5 | 22 | 8.5 | 11.5 | 91.5 |
| 8 | 9 | 9.5 | 8 | 11.5 | 6 | 21 | 8 | 11.5 | 92.5 |
| 12 | 10 | 8.5 | 7.5 | 10 | 7 | 22 | 13 | 10.5 | 100.5 |
| 12.5 | 11.5 | 6.5 | 5.5 | 11 | 7 | 21 | 10 | 11.5 | 96.5 |
| 12 | 7.5 | 7.5 | 6.5 | 10.5 | 5 | 15.5 | 7 | 10.5 | 82 |
| 9.5 | 9 | 5.5 | 5.5 | 9 | 5 | 19 | 9 | 11.5 | 83 |
| 11 | 10 | 6.5 | 5 | 10.5 | 8 | 12.5 | 7 | 4.5 | 75.5 |
| 12 | 13 | 5.5 | 7 | 9.5 | 6 | 15.5 | 7 | 10.5 | 86 |
| 15 | 11 | 10.5 | 8 | 9.5 | 6 | 18 | 11.5 | 13 | 102.5 |
| 8 | 9 | 4.5 | 5.5 | 9 | 9 | 17.5 | 8.5 | 8 | 79 |
| 12.5 | 9.5 | 6.5 | 5.5 | 8 | 7 | 13 | 8 | 7 | 77 |
| 9.5 | 8 | 4.5 | 9 | 9.5 | 11 | 20.5 | 13 | 10.5 | 95.5 |
| 8.5 | 7 | 6.5 | 7.5 | 9 | 5.5 | 21 | 8.5 | 10.5 | 84 |

GENERAL PURPOSE TABLE (continued)

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro-ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 151 | 10-3 | 121 | 3 | 3 | 7 | 13 | 6 | 5 | 5 | 9 | 31 | 7 | 14 | 8 | 5 | 9.5 | 9 | 9.5 | 4 | 8.5 | 5.5 | 19 | 9 | 10.5 | 84.5 |
| 152 | 10-1 | 106 | 4 | 7 | 3 | 14 | 5 | 1 | 2 | 22 | 38 | 7 | 2 | 6 | 4 | 8.5 | 6 | 6.5 | 5.5 | 9.5 | 5.5 | 12 | 8.5 | 9.5 | 71.5 |
| 153 | 10-2 | 126 | 1 | 1 | 4 | 6 | 2 | 5 | 2 | 33 | 29 | 16 | 21 | 16 | 5 | 6.5 | 9 | 6.5 | 7.5 | 8 | 8 | 23.5 | 12 | 10.5 | 91.5 |
| 154 | 10-4 | 130 | 5 | 3 | 6 | 14 | 8 | 3 | 2 | 28 | 41 | 6 | 14 | 11 | 4 | 11 | 7.5 | 6.5 | 6.5 | 10 | 5.5 | 19 | 10 | 9.5 | 85.5 |
| 155 | 11-6 | 105 | 3 | 1 | 1 | 5 | 9 | 6 | 1 | 44 | 42 | 9 | 15 | 3 | 4 | 12 | 9.5 | 5.5 | 9 | 10 | 6 | 20 | 7 | 9.5 | 88.5 |
| 156 | 10-8 | 109 | 4 | 3 | 8 | 15 | 11 | 7 | 1 | 20 | 28 | 14 | 10 | 11 | 5 | 13.5 | 10 | 5.5 | 5.5 | 8 | 7.5 | 16.5 | 10 | 10.5 | 87 |
| 157 | 10-5 | 132 | 2 | 4 | 2 | 8 | 13 | 10 | 0 | 24 | 34 | 22 | 11 | 10 | 5 | 15 | 12 | 4.5 | 6 | 9 | 9.5 | 17.5 | 10 | 10.5 | 94 |
| 158 | 10-5 | 100 | 3 | 7 | 3 | 13 | 7 | 5 | 2 | 42 | 30 | 12 | 20 | 3 | 7 | 10.5 | 9 | 6.5 | 8.5 | 8.5 | 7 | 23 | 7 | 13 | 93 |
| 159 | 11-5 | 112 | 3 | 5 | 9 | 17 | 10 | 7 | 5 | 47 | 40 | 16 | 0 | 8 | 6 | 12.5 | 10 | 9.5 | 9.0 | 10 | 8 | 10.5 | 9 | 11.5 | 90 |
| 160 | 11-4 | 122 | 1 | 1 | 6 | 8 | 9 | 4 | 3 | 39 | 37 | 12 | 3 | 10 | 5 | 12 | 8 | 7.5 | 8 | 9.5 | 7 | 12.5 | 10 | 10.5 | 85 |
| 161 | 11-4 | 121 | 3 | 4 | 8 | 15 | 9 | 12 | 3 | 29 | 30 | 5 | 19 | 18 | 6 | 12 | 13.5 | 7.5 | 6.5 | 8.5 | 5 | 22 | 13 | 11.5 | 99.5 |
| 162 | 10-9 | 95 | 4 | 7 | 8 | 19 | 5 | 0 | 0 | 20 | 0 | 0 | 5 | 2 | 6 | 8.5 | 5.5 | 4.5 | 5.5 | 3.5 | 4 | 13.5 | 7 | 11.5 | 63.5 |
| 163 | 11-10 | 101 | 6 | 5 | 7 | 18 | 5 | 8 | 2 | 34 | 24 | 9 | 11 | 13 | 6 | 8.5 | 11 | 6.5 | 7.5 | 7.5 | 6 | 17.5 | 11 | 11.5 | 89 |
| 164 | 11-3 | 98 | 5 | 6 | 2 | 13 | 9 | 10 | 4 | 36 | 45 | 14 | 11 | 12 | 5 | 12 | 12 | 8.5 | 7.5 | 10.5 | 7.5 | 17.5 | 10.5 | 10.5 | 96.5 |
| 165 | 11-11 | 104 | 4 | 3 | 6 | 13 | 8 | 9 | 2 | 54 | 41 | 9 | 15 | 7 | 9 | 11 | 11.5 | 6.5 | 10 | 10 | 6 | 20 | 8.5 | 15.5 | 99 |
| 166 | 11-8 | 114 | 5 | 8 | 10 | 23 | 8 | 5 | 1 | 30 | 36 | 8 | 17 | 6 | 7 | 11 | 9 | 5.5 | 7 | 9 | 6 | 21 | 8.5 | 13 | 90 |
| 167 | 11-8 | 89 | 5 | 5 | 6 | 16 | 7 | 5 | 3 | 49 | 27 | 12 | 8 | 7 | 7 | 10.5 | 9 | 7.5 | 9.5 | 8 | 7 | 15.5 | 8.5 | 13 | 88.5 |
| 168 | 12-5 | 123 | 2 | 3 | 4 | 9 | 9 | 8 | 4 | 44 | 39 | 17 | 15 | 12 | 5 | 12 | 11 | 8.5 | 9 | 9.5 | 8.5 | 20 | 10.5 | 10.5 | 99.5 |
| 169 | 11-7 | 123 | 4 | 4 | 4 | 16 | 9 | 8 | 4 | 46 | 31 | 14 | 20 | 16 | 8 | 12 | 11 | 8.5 | 9 | 8.5 | 7.5 | 23 | 12 | 14 | 105.5 |
| 170 | 11-2 | 121 | 3 | 4 | 9 | 16 | 10 | 7 | 3 | 51 | 37 | 4 | 13 | 12 | 6 | 12.5 | 10 | 7.5 | 9.5 | 9.5 | 5 | 18.5 | 10.5 | 11.5 | 94.5 |
| 171 | 11-7 | 114 | 5 | 7 | 3 | 15 | 10 | 12 | 4 | 27 | 26 | 3 | 12 | 8 | 7 | 12.5 | 13.5 | 8.5 | 6.5 | 7.5 | 4.5 | 18 | 9 | 13 | 93 |
| 172 | 11-2 | 120 | 4 | 4 | 6 | 14 | 5 | 1 | 5 | 32 | 32 | 16 | 7 | 13 | 4 | 8.5 | 6 | 9.5 | 7 | 8.5 | 8 | 15 | 11 | 9.5 | 83 |
| 173 | 11-4 | 129 | 4 | 4 | 6 | 14 | 5 | 5 | 0 | 32 | 30 | 3 | 10 | 14 | 6 | 8.5 | 9 | 4.5 | 7 | 8.5 | 4.5 | 16.5 | 11.5 | 11.5 | 81.5 |
| 174 | 11-3 | 103 | 3 | 4 | 5 | 12 | 10 | 7 | 5 | 12 | 28 | 13 | 14 | 12 | 8 | 12.5 | 10 | 9.5 | 4.5 | 8 | 7.5 | 19 | 10.5 | 14 | 95.5 |
| 175 | 11-4 | 121 | 3 | 4 | 4 | 11 | 10 | 8 | 2 | 33 | 26 | 4 | 19 | 14 | 8 | 12.5 | 11 | 6.5 | 7.5 | 7.5 | 5 | 22 | 11.5 | 14 | 97.5 |
| 176 | 11-11 | 107 | 5 | 1 | 3 | 9 | 11 | 6 | 2 | 28 | 36 | 1 | 9 | 19 | 7 | 13.5 | 9.5 | 6.5 | 6.5 | 9 | 4 | 16 | 13 | 13 | 91 |
| 177 | 11-2 | 126 | 3 | 5 | 5 | 13 | 8 | 8 | 0 | 46 | 34 | 13 | 9 | 0 | 5 | 11 | 11 | 4.5 | 9 | 9 | 7.5 | 16 | 6 | 10.5 | 84.5 |
| 178 | 10-11 | 122 | 4 | 5 | 6 | 15 | 5 | 6 | 9 | 29 | 24 | 8 | 5 | 10 | 6 | 8.5 | 9.5 | 13.5 | 6.5 | 7.5 | 6 | 13.5 | 10 | 11.5 | 86.5 |
| 179 | 11-0 | 115 | 5 | 8 | 3 | 16 | 7 | 4 | 1 | 42 | 0 | 11 | 5 | 3 | 6 | 10.5 | 8 | 5.5 | 8.5 | 3.5 | 7 | 13.5 | 7 | 11.5 | 74.5 |
| 180 | 12-2 | 106 | 5 | 5 | 7 | 17 | 6 | 8 | 2 | 44 | 29 | 18 | 3 | 4 | 7 | 9.5 | 11 | 6.5 | 9 | 8 | 8.5 | 12.5 | 7.5 | 13 | 85.5 |
| 181 | 11-2 | 119 | 5 | 9 | 8 | 22 | 7 | 10 | 3 | 21 | 28 | 7 | 6 | 6 | 8 | 10.5 | 12 | 7.5 | 5.5 | 8 | 5.5 | 14.5 | 8.5 | 14 | 86 |
| 182 | 11-5 | 115 | 3 | 4 | 4 | 11 | 7 | 5 | 0 | 22 | 36 | 8 | 9 | 4 | 2 | 10.5 | 9 | 4.5 | 5.5 | 9 | 6 | 16 | 7.5 | 7 | 75 |
| 183 | 11-8 | 110 | 4 | 6 | 7 | 17 | 7 | 12 | 6 | 34 | 34 | 15 | 2 | 14 | 4 | 10.5 | 13.5 | 10.5 | 7.5 | 9 | 8 | 12 | 11.5 | 9.5 | 92 |
| 184 | 11-7 | 106 | 3 | 1 | 4 | 8 | 7 | 8 | 3 | 34 | 28 | 11 | 18 | 16 | 6 | 10.5 | 11 | 7.5 | 7.5 | 8 | 7 | 21.5 | 12 | 11.5 | 96.5 |
| 185 | 10-9 | 121 | 3 | 7 | 5 | 15 | 9 | 7 | 8 | 43 | 28 | 14 | 6 | 3 | 8 | 12 | 10 | 12.5 | 8.5 | 8 | 7.5 | 14.5 | 7 | 14 | 94 |
| 186 | 11-0 | 109 | 4 | 3 | 4 | 11 | 7 | 5 | 1 | 41 | 27 | 10 | 6 | 8 | 5 | 10.5 | 9 | 5.5 | 8.5 | 8 | 6.5 | 14.5 | 9 | 10.5 | 82 |
| 187 | 11-3 | 175 | 2 | 2 | 2 | 6 | 6 | 7 | 2 | 23 | 37 | 15 | 21 | 19 | 7 | 9.5 | 10 | 6.5 | 6 | 9.5 | 8 | 23.5 | 13 | 13 | 99 |
| 188 | 11-3 | 90 | 4 | 4 | 5 | 13 | 7 | 9 | 5 | 38 | 44 | 13 | 16 | 5 | 7 | 10.5 | 11.5 | 9.5 | 8 | 10.5 | 7.5 | 20.5 | 8 | 13 | 99 |

GENERAL PURPOSE TABLE (continued)

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro-ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 189 | 10-8 | 125 | 2 | 5 | 4 | 11 | 9 | 6 | 4 | 34 | 43 | 15 | 12 | 8 | 5 | 12 | 9.5 | 8.5 | 7.5 | 10.5 | 8 | 18 | 9 | 10.5 | 93.5 |
| 190 | 12-3 | 94 | 4 | 4 | 4 | 12 | 6 | 2 | 5 | 32 | 47 | 19 | 9 | 1 | 7 | 9.5 | 7 | 9.5 | 7 | 11 | 9 | 16 | 6.5 | 13 | 88.5 |
| 191 | 9-7 | 145 | 5 | 4 | 5 | 14 | 10 | 7 | 2 | 23 | 47 | 16 | 15 | 14 | 8 | 12.5 | 10 | 6.5 | 6 | 11 | 8 | 20 | 11.5 | 14 | 99.5 |
| 192 | 10-5 | 112 | 5 | 3 | 1 | 9 | 10 | 12 | 6 | 26 | 40 | 9 | 20 | 4 | 7 | 12.5 | 13.5 | 10.5 | 6.5 | 10 | 6 | 23 | 7.5 | 13 | 102.5 |
| 193 | 11-7 | 92 | 5 | 6 | 7 | 18 | 9 | 7 | 2 | 24 | 43 | 18 | 4 | 3 | 2 | 12 | 10 | 6.5 | 6 | 10.5 | 8.5 | 13 | 7 | 7 | 80.5 |
| 194 | 10-0 | 106 | 4 | 2 | 3 | 11 | 5 | 7 | 3 | 28 | 43 | 8 | 6 | 3 | 8 | 8.5 | 10 | 7.5 | 6.5 | 10.5 | 6 | 14.5 | 7 | 14 | 84.5 |
| 195 | 10-4 | 116 | 5 | 5 | 1 | 11 | 9 | 6 | 2 | 33 | 51 | 12 | 2 | 5 | 5 | 12 | 9.5 | 6.5 | 7.5 | 11.5 | 7 | 12 | 8 | 10.5 | 84.5 |
| 196 | 11-1 | 114 | 3 | 3 | 3 | 9 | 12 | 7 | 1 | 40 | 46 | 12 | 4 | 4 | 8 | 14 | 10 | 5.5 | 8 | 11 | 7 | 13 | 7.5 | 14 | 90 |
| 197 | 10-0 | 114 | 5 | 2 | 7 | 14 | 11 | 2 | 1 | 36 | 44 | 12 | 13 | 6 | 4 | 13.5 | 7 | 5.5 | 7.5 | 10.5 | 7 | 18.5 | 8.5 | 9.5 | 87.5 |
| 198 | 10-5 | 110 | 4 | 3 | 3 | 10 | 7 | 9 | 1 | 33 | 37 | 16 | 7 | 1 | 4 | 10.5 | 11.5 | 5.5 | 7.5 | 9.5 | 8 | 15 | 6.5 | 9.5 | 83.5 |
| 199 | 10-3 | 120 | 4 | 3 | 5 | 12 | 11 | 7 | 5 | 27 | 38 | 12 | 8 | 5 | 8 | 13.5 | 10 | 9.5 | 6.5 | 9.5 | 7 | 15.5 | 8 | 14 | 93.5 |
| 200 | 10-1 | 118 | 1 | 2 | 3 | 6 | 6 | 6 | 4 | 34 | 40 | 4 | 14 | 11 | 9 | 9.5 | 9.5 | 8.5 | 7.5 | 10 | 5.0 | 19 | 10 | 15.5 | 94.5 |
| 201 | 10-4 | 131 | 3 | 3 | 2 | 8 | 6 | 9 | 3 | 33 | 41 | 11 | 14 | 7 | 5 | 9.5 | 11.5 | 7.5 | 7.5 | 10 | 7 | 19 | 8.5 | 10.5 | 81 |
| 202 | 10-2 | 142 | 3 | 3 | 2 | 8 | 12 | 10 | 4 | 50 | 44 | 10 | 19 | 11 | 7 | 14 | 12 | 8.5 | 9.5 | 10.5 | 6.5 | 22 | 10 | 13 | 106 |
| 203 | 10-4 | 111 | 5 | 4 | 5 | 14 | 7 | 7 | 2 | 50 | 37 | 6 | 7 | 0 | 5 | 10.5 | 10 | 6.5 | 9.5 | 9.5 | 5.5 | 15 | 6 | 10.5 | 83 |
| 204 | 10-1 | 133 | 4 | 8 | 4 | 16 | 6 | 5 | 0 | 26 | 33 | 11 | 5 | 3 | 5 | 9.5 | 9 | 4.5 | 6.5 | 9 | 7 | 13.5 | 7 | 10.5 | 76.5 |
| 205 | 11-6 | 105 | 3 | 6 | 6 | 15 | 6 | 4 | 5 | 29 | 43 | 16 | 12 | 5 | 5 | 9.5 | 8 | 9.5 | 6.5 | 10.5 | 8 | 18 | 8 | 10.5 | 88.5 |
| 206 | 10-8 | 115 | 4 | 4 | 5 | 13 | 5 | 2 | 3 | 32 | 39 | 14 | 18 | 7 | 5 | 8.5 | 7 | 7.5 | 7 | 9.5 | 7.5 | 21.5 | 8.5 | 10.5 | 87.5 |
| 207 | 10-10 | 114 | 4 | 2 | 3 | 9 | 10 | 7 | 4 | 25 | 34 | 10 | 6 | 7 | 3 | 12.5 | 10 | 8.5 | 6 | 9 | 6.5 | 14.5 | 8.5 | 8 | 83.5 |
| 208 | 13-5 | 88 | 4 | 3 | 3 | 10 | 3 | 6 | 1 | 31 | 33 | 1 | 2 | 3 | 5 | 7 | 9.5 | 5.5 | 7 | 9 | 4 | 12 | 7 | 10.5 | 71.5 |
| 209 | 11-3 | 109 | 1 | 1 | 1 | 3 | 14 | 13 | 8 | 32 | 35 | 7 | 13 | 18 | 9 | 15.5 | 14 | 12.5 | 7 | 9 | 5.5 | 18.5 | 13 | 15.5 | 110.5 |
| 210 | 13-0 | 99 | 3 | 6 | 5 | 14 | 10 | 11 | 5 | 40 | 28 | 14 | 9 | 15 | 5 | 12.5 | 13 | 9.5 | 8 | 8 | 7.5 | 16 | 11.5 | 10.5 | 96.5 |
| 211 | 11-2 | 124 | 3 | 1 | 2 | 6 | 9 | 9 | 3 | 49 | 26 | 19 | 17 | 19 | 6 | 12 | 11.5 | 7.5 | 9.5 | 7.5 | 9 | 21 | 13 | 11.5 | 102.5 |
| 212 | 11-1 | 110 | 4 | 3 | 2 | 9 | 6 | 5 | 0 | 45 | 31 | 18 | 3 | 4 | 8 | 9.5 | 9 | 4.5 | 9 | 8.5 | 8.5 | 12.5 | 7.5 | 14 | 83 |
| 213 | 11-5 | 109 | 3 | 3 | 4 | 10 | 8 | 1 | 1 | 44 | 25 | 17 | 3 | 9 | 8 | 11 | 6 | 5.5 | 9 | 7.5 | 8.5 | 12.5 | 9.5 | 14 | 83.5 |
| 214 | 13-1 | 112 | 3 | 8 | 3 | 14 | 8 | 12 | 8 | 43 | 20 | 15 | 9 | 5 | 6 | 11 | 13.5 | 12.5 | 8.5 | 6.5 | 8 | 16 | 8 | 11.5 | 95.5 |
| 215 | 11-5 | 122 | 4 | 7 | 1 | 12 | 7 | 8 | 2 | 48 | 28 | 14 | 10 | 20 | 5 | 10.5 | 11 | 6.5 | 9.5 | 8 | 7.5 | 16.5 | 13.5 | 10.5 | 93.5 |
| 216 | 12-0 | 109 | 1 | 1 | 2 | 4 | 10 | 5 | 4 | 40 | 25 | 14 | 18 | 20 | 5 | 12.5 | 9 | 8.5 | 8 | 2.5 | 7.5 | 21.5 | 13.5 | 10.5 | 93.5 |
| 217 | 11-7 | 109 | 3 | 1 | 2 | 6 | 12 | 8 | 2 | 17 | 22 | 21 | 13 | 6 | 8 | 14 | 11 | 6.5 | 5 | 7 | 9.5 | 18.5 | 8.5 | 14 | 94 |
| 218 | 12-1 | 114 | 3 | 5 | 3 | 11 | 11 | 9 | 4 | 63 | 30 | 10 | 21 | 12 | 7 | 13.5 | 11.5 | 8.5 | 11.5 | 8.5 | 6.5 | 23.5 | 10.5 | 13 | 107 |
| 219 | 11-0 | 119 | 2 | 2 | 3 | 7 | 10 | 14 | 4 | 42 | 26 | 15 | 9 | 16 | 5 | 12.5 | 15 | 8.5 | 8.5 | 7.5 | 8 | 16 | 12 | 10.5 | 98.5 |
| 220 | 11-9 | 105 | 4 | 4 | 4 | 12 | 7 | 13 | 5 | 16 | 24 | 5 | 9 | 16 | 4 | 10.5 | 14 | 9.5 | 5.5 | 7.5 | 5 | 16 | 12 | 9.5 | 89 |
| 221 | 14-0 | 94 | 3 | 4 | 2 | 9 | 14 | 12 | 5 | 35 | 27 | 13 | 14 | 10 | 8 | 15.5 | 13.5 | 9.5 | 7.5 | 8 | 7.5 | 19 | 10 | 14 | 94.5 |
| 222 | 11-7 | 107 | 3 | 1 | 3 | 7 | 9 | 6 | 2 | 37 | 24 | 18 | 15 | 11 | 7 | 12 | 9.5 | 6.5 | 8 | 7.5 | 8.5 | 20 | 10 | 13 | 95 |
| 223 | 11-11 | 116 | 4 | 4 | 3 | 11 | 12 | 8 | 4 | 58 | 30 | 15 | 9 | 5 | 5 | 14 | 11 | 8.5 | 10.5 | 8.5 | 8 | 16 | 8 | 10.5 | 95 |
| 224 | 13-2 | 102 | 4 | 6 | 7 | 17 | 8 | 6 | 2 | 25 | 28 | 7 | 14 | 6 | 7 | 11 | 9.5 | 6.5 | 6 | 8 | 5.5 | 19 | 8.5 | 13 | 87 |
| 225 | 12-2 | 114 | 3 | 3 | 2 | 8 | 9 | 10 | 0 | 31 | 36 | 14 | 13 | 6 | 6 | 12 | 12 | 4.5 | 7 | 9 | 7.5 | 18.5 | 8.5 | 11.5 | 90.5 |

GENERAL PURPOSE TABLE (concluded)

| No. | CA | Binet IQ | All Crafts | Wd-Wkg | Pro-ject | Tot. | I | II | III | IV | V | VI | VII | VIII | IX | I | II | III | IV | V | VI | VII | VIII | IX | Tot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 226 | 11-11 | 111 | 3 | 7 | 6 | 16 | 5 | 10 | 5 | 41 | 37 | 17 | 14 | 6 | 0 | 8.5 | 12 | 9.5 | 8.5 | 9.5 | 8.5 | 19 | 8.5 | 4.5 | 88.5 |
| 227 | 11-8 | 112 | 4 | 7 | 6 | 17 | 9 | 0 | 3 | 42 | 37 | 9 | 9 | 8 | 4 | 12 | 5.5 | 7.5 | 8.5 | 9.5 | 6 | 16 | 9 | 9.5 | 83.5 |
| 228 | 12-3 | 101 | 4 | 2 | 7 | 13 | 9 | 8 | 2 | 21 | 48 | 12 | 13 | 11 | 5 | 12 | 11 | 6.5 | 5.5 | 11 | 7 | 18.5 | 10 | 10.5 | 92 |
| 229 | 11-8 | 97 | 3 | 3 | 6 | 12 | 13 | 14 | 5 | 41 | 38 | 17 | 19 | 15 | 6 | 15 | 15 | 9.5 | 8.5 | 9.5 | 8.5 | 22 | 11.5 | 11.5 | 111 |
| 230 | 11-1 | 114 | 5 | 4 | 4 | 13 | 9 | 9 | 4 | 39 | 33 | 12 | 5 | 10 | 8 | 12 | 11.5 | 8.5 | 8 | 9 | 7 | 13.5 | 10 | 14 | 93.5 |
| 231 | 11-5 | 124 | 3 | 4 | 9 | 16 | 8 | 7 | 3 | 27 | 37 | 2 | 9 | 3 | 5 | 11 | 10 | 7.5 | 6.5 | 9.5 | 4.5 | 16 | 7 | 10.5 | 82.5 |
| 232 | 11-5 | 122 | 1 | 1 | 4 | 6 | 13 | 13 | 2 | 39 | 47 | 15 | 21 | 19 | 6 | 15 | 14 | 6.5 | 8 | 11 | 8 | 23.5 | 13 | 11.5 | 110.5 |
| 233 | 11-9 | 107 | 4 | 2 | 5 | 11 | 12 | 12 | 5 | 33 | 40 | 16 | 16 | 4 | 8 | 14 | 13.5 | 9.5 | 7.5 | 10 | 8 | 20.5 | 7.5 | 14 | 104.5 |
| 234 | 12-6 | 105 | 6 | 9 | 10 | 25 | 8 | 5 | 2 | 45 | 44 | 13 | 5 | 6 | 2 | 11 | 9 | 6.5 | 9 | 10.5 | 7.5 | 13.5 | 8.5 | 7 | 82.5 |
| 235 | 11-3 | 131 | 3 | 1 | 8 | 12 | 7 | 5 | 3 | 30 | 39 | 12 | 21 | 19 | 5 | 10.5 | 9 | 7.5 | 7 | 9.5 | 7 | 23.5 | 13 | 10.5 | 97.5 |
| 236 | 10-11 | 130 | 4 | 4 | 4 | 12 | 7 | 2 | 2 | 26 | 39 | 10 | 10 | 7 | 10 | 10.5 | 7 | 6.5 | 6.5 | 9.5 | 6.5 | 16.5 | 8.5 | 16.5 | 88 |
| 237 | 11-5 | 105 | 3 | 2 | 7 | 12 | 14 | 12 | 3 | 36 | 25 | 2 | 21 | 8 | 9 | 15.5 | 13.5 | 7.5 | 6.5 | 7.5 | 4.5 | 23.5 | 9 | 15.5 | 103 |
| 238 | 11-11 | 111 | 5 | 5 | 6 | 16 | 8 | 8 | 3 | 18 | 34 | 5 | 4 | 11 | 5 | 11 | 11 | 7.5 | 5 | 9 | 5 | 13 | 10 | 10.5 | 82 |
| 239 | 11-5 | 106 | 3 | 3 | 3 | 9 | 6 | 3 | 0 | 21 | 39 | 9 | 13 | 9 | 4 | 9.5 | 7.5 | 4.5 | 5.5 | 9.5 | 6 | 18.5 | 9.5 | 9.5 | 79 |
| 240 | 10-11 | 116 | 4 | 5 | 5 | 14 | 8 | 9 | 0 | 35 | 39 | 4 | 10 | 18 | 9 | 11 | 11.5 | 4.5 | 6.5 | 9.5 | 5 | 16.5 | 13 | 5.5 | 93 |
| 241 | 11-11 | 90 | 5 | 7 | 2 | 14 | 11 | 9 | 4 | 20 | 32 | 7 | 13 | 5 | 6 | 13.5 | 11.5 | 8.5 | 5.5 | 8.5 | 5.5 | 18.5 | 8 | 11.5 | 91 |
| 242 | 13-3 | 105 | 5 | 3 | 5 | 13 | 2 | 6 | 0 | 44 | 29 | 10 | 9 | 8 | 2 | 6.5 | 9.5 | 4.5 | 9 | 8 | 6.5 | 16 | 9 | 7 | 76 |
| 243 | 10-9 | 117 | 2 | 1 | 2 | 5 | 9 | 7 | 2 | 30 | 42 | 19 | 14 | 8 | 8 | 12 | 10 | 6.5 | 7 | 10 | 9 | 19 | 9 | 14 | 96.5 |
| 244 | 10-11 | 137 | 4 | 4 | 6 | 14 | 13 | 13 | 3 | 29 | 35 | 10 | 9 | 9 | 6 | 15 | 14 | 7.5 | 6.5 | 9 | 6.5 | 16 | 9.5 | 11.5 | 95.5 |
| 245 | 12-0 | 112 | 3 | 3 | 5 | 11 | 8 | 8 | 4 | 12 | 41 | 4 | 16 | 9 | 9 | 11 | 11 | 8.5 | 4.5 | 10 | 5 | 20.5 | 9.5 | 15.5 | 95.5 |
| 246 | 11-9 | 131 | 5 | 1 | 3 | 9 | 7 | 8 | 5 | 30 | 28 | 15 | 14 | 5 | 4 | 10.5 | 11 | 9.5 | 7 | 8 | 8 | 19 | 8 | 9.5 | 90.5 |
| 247 | 11-5 | 114 | 5 | 5 | 4 | 14 | 7 | 11 | 2 | 38 | 37 | 6 | 19 | 15 | 8 | 10.5 | 13 | 6.5 | 8 | 9.5 | 5.5 | 22 | 11.5 | 14 | 100.5 |
| 248 | 10-11 | 110 | 3 | 4 | 4 | 11 | 5 | 4 | 1 | 6 | 27 | 6 | 20 | 8 | 7 | 8.5 | 8 | 5.5 | 3.5 | 8 | 5.5 | 23 | 9 | 13 | 84 |
| 249 | 11-9 | 104 | 1 | 2 | 2 | 5 | 13 | 8 | 1 | 54 | 51 | 18 | 20 | 18 | 9 | 15 | 11 | 5.5 | 10 | 11.5 | 8.5 | 23 | 13 | 15.5 | 113 |
| 250 | 11-10 | 115 | 5 | 8 | 6 | 19 | 2 | 3 | 1 | 45 | 36 | 14 | 6 | 18 | 5 | 6.5 | 7.5 | 5.5 | 9 | 9 | 7.5 | 14.5 | 13 | 10.5 | 83 |
| 251 | 12-4 | 105 | 4 | 4 | 8 | 16 | 5 | 9 | 1 | 35 | 33 | 13 | 11 | 7 | 6 | 8.5 | 11.5 | 5.5 | 7.5 | 9 | 7.5 | 17.5 | 8.5 | 10.5 | 86 |
| 252 | 11-5 | 114 | 3 | 1 | 7 | 11 | 13 | 10 | 3 | 34 | 27 | 11 | 15 | 9 | 8 | 15 | 12 | 7.5 | 7.5 | 8 | 7 | 20 | 9.5 | 14 | 100.5 |

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