A statistical study of the judgments of a group of teachers as shown by their preferences among their pupils

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A STATISTICAL STUDY OF THE JUDGMENTS OF A GROUP OF TEACHERS AS SHOWN BY THEIR PREFERENCES AMONG THEIR PUPILS.

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(i) The General Field.

The understanding of personality has long been recognised as one of the main goals of psychology. Many have regarded it as the most important, agreeing with Tichener, that "Psychology is the study of experience considered as dependent on one person." (1,p.16)

However, the exact meaning of the term "personality" at once raises important difficulties. Psychologists have approached this problem from many differing points of view. This is illustrated by two modern definitions of the term. Allport, on the one hand, describes personality as "What a man really is", or in more detail, that "Personality is the dynamic organisation within the individual of those neuro-psychic systems which determine his unique adjustments to his environment." (2,p.48) In sharp contrast to this is the behaviourist definition of personality as "the end product of our habit systems." (3,p.274)

A valuable distinction has recently been made

by Gardner Murphy, who points out that the term personality has two important uses, which involve differences in point of view and method. "In the commoner usage," he states, "the term embraces the sphere of individual differences...It is a catalogue of certain human variabilities. The second usage embraces the thing which all personalities, as such, possess - the thing that marks off a personality from all other objects, such as a tree or a triangle...We are interested both in man in general and in the individual man for his own sake." (4,p.1)

The approach of the investigator will therefore determine which definition of personality he adopts. The intense and accelerating study of psychology during the past hundred years has led to the development of points of view which can conveniently be classified by their attitude to problems of human personality. Within this frame of reference three main tendencies can be distinguished. These may be summarised as the Individualistic, the Comparative and the Field approaches.

An individualistic attitude has been adopted by Stern and Allport. Writers of this school emphasise the importance of studying individual persons rather than functions. Comparisons between persons they consider as

of secondary importance.

On the other hand, many psychologists use a comparative technique to examine personality in terms of its common aspects. Two influences have strongly affected recent work in this field: the success of intelligence testing, and modern biological studies of the human organism. Wide researches have been carried out in the past twenty years on the existence of common traits, on psychometric methods and on techniques of factor analysis.

Latest in the field, and largely influenced by the concepts of physical science, are the field approaches. Still in process of rapid development, they may be summarised as efforts to study personality dynamically and in its social setting. Important contributions have been made in this field by the Gestalt school, and by Lewin.

Appraising the value of these different contributions, Murphy distinguishes three levels of complexity in the study of personality. He sees, firstly, an atomistic conception of personality as "an object or an event in a larger context - a dot on a chart...It is identifiable, strictly localised in time-space, and homogeneous. Its internal structure need not be considered." At a second level he likens

personality to a chrysalis. "It is again identifiable and strictly bounded, but it has internal structure. It is no longer homogeneous; it is organised." Personality at the third level, however, he regards as a node in a field, "defined, limited, governed by the field relations...a level of analysis at which the man-world relation, the organism-environment may be studied." (4,pp.3-5)

The human personality, then, may be studied at each of these three levels. The second, or structural approach describes and analyses attributes, and discusses change and development within the personality. It has, therefore, the important advantage over the first approach, of presenting a clearer picture of personal changes. On the other hand, the third view, while accepting this dynamic pattern, studies development in the light of the organism-environment field; thus it may be said to view personality in a deeper perspective.

Assessing the relation between the structural and the field approaches, Murphy suggests that the former "may, if required be recast, along with still other conceptions, in a new unity; the diverse views may be rephrased and simultaneously used. Anyone may re-examine the experimental and clinical evidence of

today, and attempt his own unified conception." (4,p.12)

In the present study, facets of personality which fall into the second field will be examined; that is to say, they will be approached from a structural and comparative point of view.

(ii) Analysis of Personality.

Allport has indicated a frame of reference for the comparative study of the structure of the human personality in his dictum that "Every personality develops continually from the stages of infancy until death, and throughout this span it persists, even though it changes." (2,p.102)

The individual is regarded as being constitutionally equipped from birth with a threefold inheritance - physique, temperament, and general intelligence. The term temperament may be defined as covering "those aspects of mental life which are primarily conative or affective, tendencies to feel or act." (5,p.27)

Varying accounts have been given of the processes involved in development and maturation. At the beginning of the century, for instance, McDougall depicted in the individual a common pattern of instincts reacting on his environment, and gradually leading to the growth of powerful sentiments. Of these, he

stressed especially the sentiment of self-esteem, the "self-regarding sentiment", because of its unifying influence on personality. (6,pp.110,436)

Much recent study has been devoted to a fuller examination of the processes of development. This has led to the conception of the trait, as a fundamental element of the personality. Progress in this field was surveyed by Allport (1937). He sees development in terms of the growth of "functional autonomy". This he explains as the development of "newly created interests... displacing older formations, and henceforward serving as functionally autonomous systems, guiding the further development of personality until they in turn are gradually or suddenly transformed." (2,p.212) In this Allport emphasises the dynamic and individualistic aspects of personality.

According to Allport, an observer sees the process of development expressed in terms of traits, the existence of which he infers from overt behaviour. These traits develop from rudimentary feelings shown towards any object, feelings which may be of any intensity or duration. As a person matures, these feelings tend to become organised into traits, which Allport defines as "the integration of specific habits, expressing characteristic modes of adaptation to one's surround-

ings. Belonging to this level are the dispositions variously called sentiments, attitudes, values, complexes and interests." To him then, "the most important of all levels in the structure of personality is the trait-level." (2,pp.139-142)

To this level he refers all assessments of personality. He distinguishes, moreover, between individual and common traits. From the innumerable lists of individual human reactions, he claims that a much smaller number of common traits can be selected. These common traits are "those aspects of personality in respect of which most mature people within a given culture can be compared." It is the existence of such roughly comparable modes of adjustment by individuals in society which justifies quantitative scaling by an observer. (2,p.300)

Allport has compiled a provisional psychograph of 21 variables for the assessment of personality, after a critical examination of many possible common traits proposed by investigators. His criteria are (i) that a variable can be clearly distinguished and measured, and (ii) that it can be shown to be normally distributed in an average American population. A summary of his psychograph is given in Table I. Allport states that the average intercorrelations of

TABLE I.

LIST OF COMMON TRAITS OF PERSONALITY.

(After G.W. Allport).

PSYCHO-BIOLOGICAL FACTORS			COMMON TRAITS			
			ATTITUDE			
				DIRECTED TOWARDS		
PHYSIQUE	INTELLIGENCE	TEMPERAMENT	EXPRESSIVE	SELF	OTHERS	VALUES
(i) Symmetry-Deformity	(i) Abstract, High-Low.	(i) Emotions Broad - Narrow	(i) Ascendancy-Submission.	(i) Objective-ness - Self-Deception	(i) Gregarious-ness - Solitari-ness	(i) Theoretical-Non-Theoretical.
(ii) Health - Ill-Health	(ii) Mechanical High-Low	(ii) Emotions, Strong - Weak	(ii) Expansion-Reclusion.	(ii) Self-Assurance-Self-Distrust.	(ii) Altruism-Self-Seeking.	(ii) Economic - Non-Economic.
(iii) Vitality-Low-Vitality	(iii)	(iii)	(iii) Persistence - Vacillation	(iii)	(iii) Tact - Tactless-ness.	(iii) Aesthetic-Non-Aesthetic.
						(iv) Religious-Non-Religious.

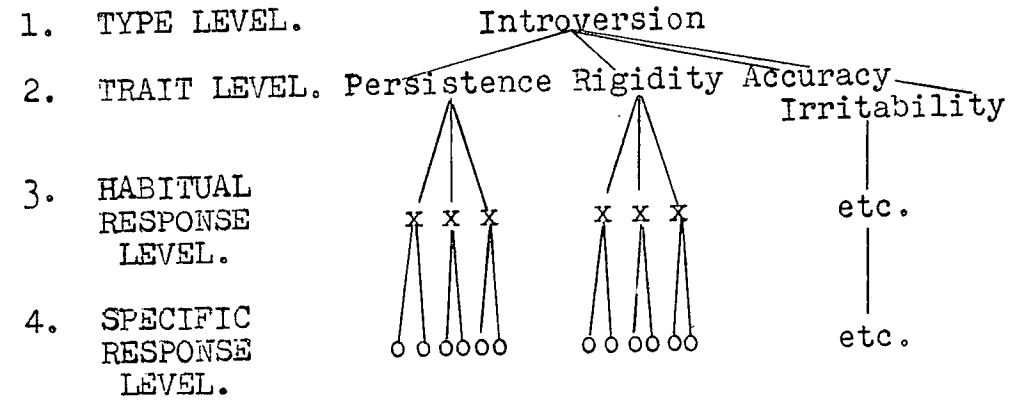
these traits are not high. His 'psycho-biological variables' represent "the raw material from which traits develop." (2,ch.xv)

Great emphasis is placed on the origin of traits in Murphy's biosocial study of personality (1947). Here personal traits are closely examined from the organic point of view. They are defined as a person's "physiological strengths and weaknesses, especially the strength of his drives, his tendencies to excitement and relaxation; his proneness to one rather than another type of physiological integration." Murphy regards personality traits as developing through three levels - (i) broad tissue responses, (ii) persistent reactions by individual tissues, and (iii) persistent interactions between tissues. The following description is condensed from his exposition of these three stages.

"First, at the level of general undifferentiated response, we look for the characteristic mode of responses of the tissues, taken collectively. Since the classification of traits must, so far as is possible, be in terms of their roots, we must first look for the roots in the general dispositions of tissue. Second, there are traits which depend on the properties of specific kinds of tissues: they represent the second, differentiating level of development. Such traits as long

summarised in the hope expressed by Eysenck, of reconciling factors, that is "principles of classification described by selective operators".. with.. "demonstrable Mendelian factors, inherited in predictable ways. " Such a result would "deserve a higher status scientifically than a mere principle of classification; it could rightly be regarded as a fundamental dimension of the mind. " (8, p.17)

Eysenck and Cattell both set out to extract mathematical factors which describe personality in terms of clusters of traits, organised at type level. The former sketches a typical example :



These four levels he equates with the 4 types of factors classified by Burt as (i) general factors, (ii) group factors, (iii) specific factors, and (iv) error factors. Burt, however, has stressed that this classification of factors is "a quantitative adaptation for the case of variables of a qualitative scheme

the response itself can be registered, rather than passing through the verbal symbolic system of the rater." On the other hand, where symbolic traits are concerned, rating is of value. This "incorporates the results of many observations and hence gains in generality and reliability...When a trait involves any considerable degree of elaboration, the possibility of an organic definition of a relatively simple type is immediately lost...because at present, even with the electro-encephalogram, there is no chance of tracing such constituents." The symbolic trait then, is ultimately based on the needs and responses of the tissues, though these are more subtle and complex than in the case of an organic trait. These symbolic traits tend to become integrated inside the person, and others can make an integrated response to them. "Symbolic traits," Murphy concludes, "constitute a large part of the personality manifestations with which social psychology is especially concerned." (4,pp.286-287)

It is relevant at this point to describe the use of trait conceptions in the work of contemporary experimenters in this field, who use measurements of traits, made mainly by rating methods, as a basis for the isolation of factorial patterns. Prominent in the field are Burt, Eysenck and Cattell. (7,8,9) Their aims may be

warming-up time or perseveration may well represent the idiosyncrasy of the nervous system. Third, traits may arise from a patterned interstimulation of various specific differentiated tissues. Thus lassitude may conceivably be traceable to a neurocirculatory inadequacy; apprehensiveness, to an endocrine involvement. From the organic point of view, personality tendencies of these three types comprise all that the organism is, and all personality traits are included under one or other of these types." (4,pp.130-131)

Having insisted on the organic roots of human traits, Murphy considers the role of the learning processes. He emphasises the pressure of the verbal symbolisms of human civilisation. These are of paramount importance in estimating traits and responses, when these have acquired a social aspect. In his words, "Most social attitudes, most evaluations of the self- most confessions of weakness, for example, which are used by the thousands in framing all sorts of questionnaires and trait lists - are released by symbolic stimuli and funneled in symbolic form." Traits therefore can be analysed in two ways. In the case of an organic trait, study is best undertaken in the laboratory. "The situation arousing the response can be more fully defined in the case of an experiment, and

originally developed for the case of attributes." To him, "factor analysis can at most describe only the general structure of the mind or of the population; functional problems require other methods of research." (7,p.250-251). This important qualification will be discussed later in this section.

Working on a population of some 700, Eysenck isolated two general factors, neuroticism and introversion. He says of these: "There is a certain amount of evidence in favour of the view that as 'g' or intelligence is a general factor in the cognitive sphere, so "neuroticism" is a general factor in the conative sphere, while "introversion" is a general factor in the affective sphere. These factors are conceived as relatively orthogonal...Personality is then conceived as the integration and interaction of these three factors within the general framework of the person's physical make-up." (8,p.261).

Cattell somewhat similarly seeks "source traits" which he isolates from clusters of "Surface traits" by factorial analysis. He proposes 12 primary source traits which he sees manifested in all data." To him, these represent fundamental dimensions of personality; They are as follows :

1. Cyclothymia - Schizothymia.
2. 'g'
3. Emotional Maturity.
4. Ascendancy - Submission.
5. Surgency - Desurgency.
6. Anxious Emotionality - Rigidity of Poise.
7. Cultured Mind - Boorishness.
8. Character Integration.
9. Openmindedness - Withdrawn Mind.
10. Neurasthenia - Vigour of Character.
11. Hypersensitiveness - Tolerance.
12. Surgency - Paranoia. (9,p.261)

Burt has re-examined much of his detailed data in connection with schoolchildren. He gives the following account of his results. "With the normal children the following factors are fully significant: (i) a general factor of emotionality, (ii) a bipolar factor distinguishing sthenic (or extravertive) from asthenic (or introvertive) emotions, and (iii) a further bipolar factor distinguishing euphoric (or pleasurable) from dysphoric (or unpleasurable) emotions. ...Provided the term 'type' is taken to mean a pattern of factor-measurements to which individuals may approximate in varying degrees, and not one of two mutually exclusive classes, the analysis appears fully

to confirm the existence of the most commonly cited pair of 'temperamental types', namely, the 'objective', 'tough', or 'extraverted' and the 'subjective', 'tender', or 'introverted' respectively. The distinction is found both among the normal and among the psychoneurotic. " (10,pp.202-203)

The work of this school may be described as a search for broad classifications of traits which may serve as a framework of reference. As yet, however, no one scheme has reached the stage of general acceptance. Furthermore, the assumption that mathematical factors can be so identified with psychological qualities has been strongly challenged.

Such criticisms may be outlined under three headings. Firstly, it is claimed that the techniques of analysis do not succeed in fully assessing the degree of strength of a trait, for in most cases, the measurement assumes a normal distribution of the trait. In Murphy's words, "Any given personality has its own characteristic degree of tightness of structure.. Although statistical devices such as factor analysis are suitable for testing broad dispositions and the form of their relations to other dispositions, such techniques are not at present capable of indicating to what degree the factors defined function in each person

as autonomous units and to what degree they fuse with other tendencies. " (4,p.643).

Again, such techniques do not indicate the degree of integration of the personality. Much is lost by over-simplification. The person "achieves its integration slowly and incompletely; all normal people have many loose ends...Character does not reduce itself to a formula, and personality cannot be described in a phrase, however brilliant. " (4,p.661). The factorial pattern thus ignores a wide field which involves the study of the relations of self, personality, ego-type and social type.

A third criticism is made by exponents of the field theory. To them, "a study of situations that act on persons should be at least as full as is a study of the ihternal structures which respond to these situations." (4,p.877)

To estimate their real value, the schemes of trait organisation proposed by factorial workers must be examined in the light of these criticisms. It is doubtful whether their schemes can be adequately related to the complex pictures of personality, which emerge from the evidence of other workers. In view of this disagreement, factor-analysis must be regarded as one among a number of differing approaches, which so far have not been integrated. The ultimate value of any

factorial scheme depends on the relevance of the postulates concerning personality on which it is based. As Burt has declared: "Factors as such are only statistical abstractions, not concrete entities...we use factors in psychology as we use rectangular coordinates in other sciences...The primary value of such factors must obviously consist in their utility for purposes of systematised description. Whether or not any factor actually extracted or computed happens to have a psychological significance is a problem that must depend, not on the method of factor analysis employed, but upon the proper and relevant selection of traits and persons." (7,pp.249-250)

The following themes have thus been discussed in this section: the concept of traits as treated by Allport and Murphy; analyses of personality by the factorial analysis of measured traits; and the limitations of this technique. The place of such analytical methods in the general field of personality study having been indicated, verbal methods of measurement will next be discussed in detail.

(iii) Measurement of Personal Qualities.

Vernon has made a critical survey of the chief verbal techniques which have been used to assess

personality, up to 1938. (11) His conclusions are discussed in this section. Modifications and developments of the past decade are referred to in Chap. II, sec. iii.

Examining techniques suitable for assessing individuals, Vernon distinguishes three groups:

A - Tests and Scales for measuring individual attitudes.

B - Assessments of human traits by rating.

C - Self Ratings and Personality Questionnaire Tests.

These may be regrouped into two classes, with Assessments by Rating (B) contrasted to Tests and Scales (A and C). Ratings, he considers, "may be regarded primarily as the reputation of the ratees in the eyes of the particular set of raters." (11,p.55) The other group of measurements convey "a self-portrait: they represent the picture of himself which the testee wishes to convey to the experimenter. Such a picture may be of considerable value if it is not regarded as a direct measure of some trait, but is compared and contrasted with information about the testee obtained from other sources." (11,p.87)

Vernon examines the main psychological difficulties involved in the use of these methods. None "can claim to measure psychological variables such as traits, attitudes or interests with the same degree of objectivity or accuracy that are achieved by tests of abilit-

ies." This is in the main due to the difficulty of analysing emotional or conative behaviour. Many temperamental traits have little or no effect on the physical environment, but are expressed only in the impression made by a subject on his acquaintances. (11,p.104)

Besides this margin of error, a further difficulty of a statistical nature arises. The assessment of traits involves the establishment of a quantitative basis; in other words, the assumption that the differences between persons can be expressed as though they were linear variables. Such a proceeding he criticises as "relatively abstract, inaccurate and awkward as descriptions of the rich complexities of our psychological material." At the same time however, he does not reject the procedures: "the poor tools at our disposal have already revealed much that was unrecognised in the days of purely qualitative observation and interpretation of human behaviour." (11,pp.104-105)

Considering particular techniques, Vernon closely studies their relative accuracy. His conclusion as to the relative merits of ratings and testing methods is based on the work of May and Hartshorne (1930), and on a number of experiments of his own. He decides that "an ordinary set of pooled ratings is superior to any single personality test or short battery of tests." (11,p.60)

From these considerations, rating methods may reasonably be deemed of direct value in attempting to assess personality, in conformity with the trait structure which has already been described.

Vernon makes a detailed examination of various methods of rating. He contrasts two main approaches, ranking, and numerical ratings. The chief advantages of the two procedures may be summarised as follows:

Ranking. This ensures a full comparison by each judge of every item with every other before deciding on their positions. Since the comparison is obligatory, and is purely relative, there is not that avoidance of extreme judgements, which is frequently characteristic of ratings. On the other hand, the method can only be applied to a small group of subjects, with between ten and twenty as the most desirable size. One statistical assumption of the method is of great importance. A rank order assumes a highly artificial distribution, with equal intervals between each item. This assumption has been strongly criticised. Burt for instance, stresses that "when we come to subtract the rank-numbers and add the differences, we are going beyond the postulates of mere order or rankings. We are making assumptions about the spacing of rank-numbers; and, if there is reason to believe - even the slender reason of subjective impression - that

the spacing is much wider at some parts than at others, then I should hold that the rank formulae are strictly speaking invalid." (7,p.124,note 2) Rank orders can however be transformed into sigma units (or equal deviates), which do assume a normal distribution.

Ratings. "There is", comments Vernon, "an inveterate tendency to leniency among almost all raters. Unless specially trained, they put far too many ratees above the average on any desirable trait, too few below, apparently regarding an average or 0 rating as something discreditable." (11,p.46) Again, the human understanding is incapable of discriminating between more than about five grades, in scoring individuals on any trait scale. On the other hand, ratings can be applied to larger groups than can be ranked satisfactorily, and a normal distribution can be ensured by using suitable units of measurement.

Thus Vernon tends to regard rating as the most generally useful method of assessing personality, which has so far been devised. In his own words: "No accurate and easily applicable tests are available for the assessment of most personality traits, so that we are forced to rely very largely on ratings. And ratings actually possess a considerable advantage over such personality tests as have been devized, in that they are often

applicable without the knowledge of the ratees, whereas the person who knows that he is being tested can hardly be expected to exhibit his normal emotional characteristics." (11,p.44)

(iv) Recapitulation.

Many workers have adopted a structural approach to problems of personality, and attempt to describe it in terms of measurable traits. The limitations and advantages of such a method are discussed, and illustrated by the researches of Burt, Eysenck and Cattell. Two important problems have not yet been satisfactorily overcome: (i) the establishment of a generally acceptable classification of traits, and (ii) the evolution of objective standards of measurement which will satisfy rigid mathematical standards.

Chapter II.

The Use of Judgment.

(i) Judging Ability.
(ii) Teachers' Assessments.
(iii) Recent Researches.
(iv) Recapitulation.

(i) Judging Ability.

It was shown in the previous chapter that any rating technique - that is, the measurement of a trait by those acquainted with the subject possessing it - is subject to important statistical limitations. Further limitations are caused by using the human understanding as a measuring instrument.

Allport describes six major difficulties in the technique, arising from these conditions.

(i) The variable must be clearly defined. It is essential that all the raters in any experiment judge the same trait. This is partly secured by accurate definition, but the experimenter must also check carefully that his judges have in fact understood his terms. This can usually be assured by personal discussion.

(ii) Ranking and scoring scales must be neither too coarse nor too fine. The limitations of the human

mind in appreciating degrees on a rating scale have already been discussed.

(iii) Judges require training if their verdicts are to be consistent and reliable. Thus, previous explanations of rating methods and sources of error generally improve the quality of ratings.

(iv) Variables which are overt in expression are more reliably rated than those which are covert. A rater must therefore have experience of his subjects' behaviour in situations relevant to the trait he is studying. In constructing his psychograph, Allport found that 18 judges agreed best in the cases of Ascendance and Expansion, and less so in the cases of the remaining traits.

(v) Ratings tend to be complimentary. In general, raters avaid the lowest values of any scale. This can be overcome by the use of rankings, which forces a series of comparisons, and results in definite first and last placings.

(vi) The 'halo-effect' is important. There is a persistent tendency among judges to rate some subjects highly in all qualities, because a generally favourable impression has over-ridden a judge's power of discrimination. Allport suggests palliatives: careful attention to the other five

limitations; avoidance of any variables which invite moral censoriousness; and specific warnings to judges against the effect. (2,pp.436-447)

Having enumerated the main errors which have been shown to exist among judges in general, Allport then discusses the qualities which govern the ability to judge personality. In this connection, he quotes the work of Estes (1937), who studied the performance of 37 judges. Estes found no relation to exist between age, length of professional service, and judging ability; and that better results were obtained for overt than for covert traits. He further found that excellence of judgment varied with:

(i) the inherent ability or shrewdness of the judge.

(ii) the nature of the trait rated.

(iii) the open or enigmatic nature of the subject. (12)

Allport concludes, that to ensure the most trustworthy judgments "it is necessary to have a gifted judge, applying his skill to certain overt and readily accessible traits in a subject who is not deceptive or enigmatic." He approves of the popular belief that women are in general more reliable judges of personality than men, on the broad ground that their status in society depends to a greater extent on their ability to sum - up possible rivals and partners. He considers a wide experience of

life of great value in developing shrewd judgment.

The use of judges in personality rating is thus seen to introduce numerous sources of error. Suitable techniques can reduce these errors, but they cannot be completely prevented.

(ii) Teachers' Assessments.

In spite of the errors and limitations which may exist, the rating of personality is widespread in everyday life. The business man, the probation officer, the member of a selection board, in fact all who are placed in authority have at some time to try to measure the non-intellectual characteristics of personality.

In no section of society is this more evident than in the schools of England. A teacher is called upon to exercise such powers of judgment throughout his career. Each term he is required to report on his pupils, and he is accustomed to supplement a mark or class position by a more revealing comment. Such remarks as "Fair" : "Lacks the power of sustained effort" : "Is beginning to show his true capabilities" , all represent more or less crude ratings on a scale common to parent, teacher and pupil.

Many modern educationalists consider that the measured opinions of teachers should have greater weight

than at present in determining the future of their pupils. Already in 1921 Rugg, examining "Intelligence and its Measurement" had found that "prognosis of success in study depends partly on evaluation of temperament and character." (13,pp.1-5) The Norwood Report (1941) drew attention to the importance of the teachers' judgments of the aptitudes of their pupils, in allocating them to a suitable secondary school. (14,pp.15-25) A similar attitude was shown by educational psychologists in a recent symposium on selection for secondary schools.(15,16) Alexander for instance, stressed the importance of including a judgment of a pupil's temperamental qualities, especially of Persistence and Stability. Burt stated that "as regards character qualities, however, the most urgent need...is that teachers and others who are responsible for the final decisions should possess a more precise knowledge as to what qualities of temperament and character can and cannot be safely assessed at this early age (up to 14), and how to report their observations and their gradings." (15,p.65)

An effort has been made to standardise this procedure, and to minimise errors, by the use of a School Record Card.A suitable form has been published.(17) It provides for annual estimates throughout a child's school career, under the following headings:

(i) School Work.

(ii) Noteworthy Activities and Interests.
(Intellectual, Practical, Aesthetic, Social, Physical).

(iii) Special Abilities.
(Verbal Facility, Reasoning, Speed of Work, Observation, Practical Ability, Artistic Ability).

(iv) Noteworthy Disabilities.

(v) Temperamental Qualities.
(Prevailing Attitude, Self-confidence, Self-criticism, Sociability, Co-operation, Perseverance, Conscientiousness).

Two forms of guidance are given to teachers using this form. They are invited to follow a roughly normal distribution of assessments, adjusted to a 5 point scale: e.g. A - 5% : B - 25% : C - 40% : D - 25% : E - 5%. A suitable description of each trait is given to illustrate the scale: e.g: for Perseverance.

A - very persevering and tenacious.

B - persistent in spite of difficulties.

C - normal, persists until real difficulty arises.

D - lacking in persistence, easily discouraged.

E - easily distracted, very lacking in persistence.

Thus it is clear that the problems presented in teachers' judgments are only a particular case of those general problems of rating already discussed. The use of rating introduces inaccuracies of measurement which can be ascribed partly to the subjective bias of the human mind in its judgments, and partly to the elements of personality selected for measurement. The detailed conclusions of some recent researches on teachers' assessments are discussed in the next section.

(iii) Recent Researches.

Numerous studies of particular aspects of teachers' judgments have been made within the past ten years - that is, since the surveys of Vernon and Allport. A representative selection is treated in this section.

Valentine (1940), discussing surveys of evacuated children, questions the validity of the rating method. He points out that a complex trait (e.g. reliability) can be broken down into specific questions, such as :

(a) Is he truthful, does he lie or romance?

or (b) Can he be relied on to behave when the teacher is not present?

or (c) Will he torment younger children if no one is by?

Valentine asks if these are not largely independent. Rather than rating, he suggests that close

observation of a child's specific reactions to such groups as older children, younger ones, and adults, may show limitations in respect of one group. This might be of significance for the child's future development. Such considerations lead him to propose the use of a specific questionnaire (e.g. Have you seen him bullying: YES - NO). Another point in favour of this procedure would be the minimising of the halo-effect, which he is recognising as strongly influencing rating results. (5)

Burt (1945) using a wide range of data accumulated over many years, has examined the reliability of the assessments made by teachers. He points out the value of an analysis of variance in examining them, and his conclusion is that "in assessing most character qualities their reliability, though never very high, is higher than that of a psychologist depending on a single interview or any psychological tests at present in use." (18)

Thomson cites an examination by Clark of character assessments of primary school children on School Record Forms. Clark concluded that "the teachers' had been much influenced in their character ratings by the pupils' known success in school subjects and school examinations." (19,p.112)

Studying "Aspects of Personality in the Class-

room", Howie (1945) has examined the ratings of a population of some 300 schoolboys. (20) Analysing the results, he isolates 4 factors:

I - a judgment of all-round adequacy.

II - an assertive quality.

III- aspects of the individual making for group approval.

IV - excitability - placidity.

In the course of this research, he pays particular attention to halo-effect. This he identifies with his first, general factor. After referring to the pioneer work of Rugg (1921) (13), he distinguishes three separate effects which may be present. These are:

(a) A tendency to prefer certain individuals to others, and to rate the preferred individuals highly in desirable traits.

(b) A tendency to rate in terms of a certain general attitude to the qualities themselves.

(c) A tendency to judge all-round personal worth, (as evaluated of course by the judges), rather than to discriminate in terms of particular qualities.

Howie does not regard the halo-effect as wholly bad. He remarks that "it does not appear legitimate to describe halo-effect as a constant error in the sense

that it is nothing but a disturbance factor in judgment and cannot signify anything judged. After all, the raters did make a serious effort to discriminate between the boys in respect to personal qualities. In effect, this halo would appear to be a global or "gestalt" approach to the estimation of personal qualities, i.e. a reaction to the whole person rather than a piecing together of personal impressions." (20,p.23)

Wedeck (1946) has studied the relationship between personality and "psychological ability". His main concern was to examine judging ability, and he concludes that "in order to judge expression it is necessary to understand personality...To assess correctly the personalities of a wide variety of people, the judge must have attained a high degree of complexity as well as insight into his own motives, he would have to possess a high 'psychological ability'. To measure this...tests were devised." (21)

The significance of teachers' assessments has also been studied by Nath (1948). He found that their predictive value was low, and considered unreliability and the halo-effect mainly responsible for this. (22)

These typical recent researches show clearly that full agreement as to the value of teachers' assessments has by no means been reached. The position today

has been well described by Oliver (1946). He declares that "the following problems require further research before a definite judgment can be made.

(i) To find in what respect children differ, and what is their relative significance for educational guidance.

(ii) To establish reliable methods of measuring or assessing the non-intellectual characteristics of personality.

(iii) To isolate significant characteristics, and determine whether an objective measurement can be devised.

(iv) To study the value of the teachers' considered opinion, and determine the consistency between teachers of their assessments." (23)

(iv) Recapitulation.

The accuracy of rating largely depends on the capacity of the human mind to distinguish between a large number of variables. Judging ability varies considerably between persons, and in respect of different qualities. In the field of education it is proposed to make increased use of teachers' assessments of their pupils' temperamental qualities. Recent researches emphasise the limitations of rating, but no satisfactory substitute is proposed.

Chapter III.

Assessments and Personal Preferences.

(i) Preference.
(ii) An Alternative Approach.
(iii) An Experiment Outlined.

(i) Preference.

Side by side with the attempt by the psychologist to assess personality by a synthesis of traits, there exists another form of judgment so common as to be normal in everyday life. This is the plain man's ability to express an immediate and strongly felt preference for persons and things. He exercises this power of liking or disliking in innumerable situations. As a consumer, his likings are attentively studied by merchants and advertisers. His preferences enable him to pronounce his verdict on works of art. His choice of friends or partners, his estimation of a public man, too, is commonly expressed by him in terms of liking or disliking.

The characteristics of such immediate judgments are as follows: they are usually pronounced without any conscious analysis of motive; they are often accompanied by strong emotional feeling; and in many cases they show great diversity -'quot homines, tot sententiae'.

It is not proposed to discuss here the mental

processes affecting this ability to express a preference, and it will be assumed henceforward that this power is possessed by the majority of human beings. Most psychologists, as we have seen, tend to regard such preferences as particular cases of ratings, and to apply to them the same tests of reliability. Disagreement among a number of persons is explained in terms of the halo-effect, and as a lack of the ability to judge shrewdly. Alternatively, the trait in question may be regarded as unsoundly conceived.

In view however, of the lack of general agreement on the value of ratings as a means of constructing a complete picture of personality, together with the known tendency of human beings to give a verdict in global or gestalt terms, it is reasonable to suggest that both may be legitimate approaches. If they are to be established as in any way comparable, some means of measurement common to both fields is needed.

It is the purpose of this study to investigate the possibility of devising such a measure, and to collect evidence as to whether preferences can be harmonised with the objective measurements which have been established by previous investigators.

(ii) An Alternative Approach.

Valuable work has recently been done in the field of aesthetic appreciation. In particular, Eysenck (1940) and Peel (1945) have investigated the factors governing aesthetic opinions. Since this involves the study of personal preferences, a survey of the techniques used may be of value in the field of personality assessment.

Eysenck summarises his experiments as "an objective examination of the different factors which determine aesthetic appreciation. The typical experiment from which this analysis derives is the following: A number of objectives having aesthetic value (paintings, photographs, statues, vases, book-bindings, flowers, odours, polygonal figures) are presented to the subject and he is told to rank them in order of personal liking, independently of what he conceives to be their conventional value. (Care is taken to ensure that he should be ignorant of the conventional value in any case). He may be asked to repeat the ranking after a certain space of time has elapsed. His ranking is then compared with rankings of others obtained under similar conditions, and the results are analysed by means of various statistical techniques." (8,p.212)

Eysenck in this work isolated a general and a bipolar factor. These he identified with (a) artistic form and good taste, and (b) brightness-restraint of colour and content. After constructing a test to measure (b), he found that it correlated positively with temperamental tests of extraversion-introversion, radicalism-conservatism, and youth-age. Finally he tried to base an aesthetic formula on regression equations derived from the correlation of various objective qualities with actual preference judgments.

Peel, working from similar data, has examined the connection between the aesthetic factors and the artistic qualities of pictures, rather than their reference to the temperamental qualities of the judges. (24, 25, 26) The following is condensed from his description of his work. "We begin by considering a test composed of a number of pictures which are to be arranged according to the order in which they are liked or preferred aesthetically. In detail, each person's order of liking would be different, but we might expect certain broad similarities. The orders may be compared by correlation, and the correlation coefficients analysed to give the factors which characterise the group of individuals. We can obtain a measure of the aesthetic qualities of the pictures by asking a team of experts to arrange the items in order of,

say, realism, quality of technique, composition, colour and so on. Each person's liking could then be correlated with each of the orders according to these qualities, and an estimate of any person's aesthetic choice obtained in their terms, thus giving a more complete description of his liking. An advantage in using this method of analysis is that the person is quite unaware of the process or even intention to analyse his aesthetic preferences." (24,pp.61-62)

Here then, has been evolved a method of analysing a personal preference in terms of the objective qualities of the variable rated. If such a method could be applied to assessments of personality, and a rater's preference could be expressed in terms of the objectively measured traits of the person rated, light might be thrown on the general value of the ratings. Alternatively, more information might be given concerning the process of 'over-simplification'. Possibly a disagreement between judges could be accounted for in terms other than as a weakness of the human understanding.

The aims of the writer's investigation are therefore twofold:

(a) To try to apply the above method of analysis to judgments of personality.

(b) If the method proved practicable, to discuss the psychological meaning of the results.

(iii) An Experiment Outlined.

After studying the methods used by Eysenck and Peel to analyse aesthetic preferences, the writer decided to investigate the hypothesis that a similar method might be applied to preferences among persons.

In designing a suitable experiment several considerations at once became clear. Attention was first paid to the size of population to be sampled. Since it was desired to study the judgments of teachers, and since also the teachers' preferences must be given in respect of children with whom they were intimately acquainted, the field would be limited to a single school, at all events for an initial experiment. In a certain secondary modern school four age-groups of children were available at this time. Three of these numbered approximately 90 apiece, and there was also a fourth year class of 26 boys and girls.

To use any of the groups of 90 would involve difficulties: the comparative shortness of the school life of these children; several teachers had not had good opportunities of observing them, both within and outside the classroom; and finally, it appeared unreasonable to ask that some 45 children of each sex, grouped in three different classes, should be ranked or rated by direct

comparison.

It was therefore decided to select the compact fourth year group of 26, and accept the statistical limitations implied, in view of the greater maturity of the children, and the better opportunities enjoyed by the teachers of judging them. These considerations are discussed more fully in the next section.

The group having been decided, ranking appeared to be the most satisfactory method of measuring preferences. Although this would entail the assumption that rank orders could be given a numerical equivalent, a more decided order of preference would tend to be given than if a rating and scoring technique was used. (This point was more fully considered in Chap.I, sec.iii) Since this was a mixed school, it was possible to analyse the data in terms of men and women teachers, and of boys and girls.

To avoid ambiguity, certain terms used in the experiments will now be defined. Throughout this study, the usage suggested by Peel will be followed. He states: "I used the term criterion for any quality in the pictures which might influence a person's preference...A better term would be <u>determiner.</u> The term criterion could be retained for the "preference" order, as this order is a criterion of the subject's liking, and the test only samples this

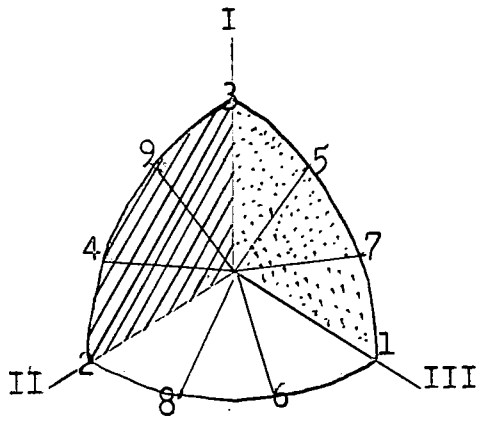
"liking". If the term criterion is used in this way, and the word determiner reserved for artistic qualities, then the terminology is in line with that used in aptitude where the criterion is estimated from a weighted sum of determiners." (27)

In this study therefore, Criterion is used to denote the teachers' preference order among their pupils, and Determiner to denote an objective quality of those pupils which might be found to influence those preferences.

Peel has fully discussed the theoretical requirements of ideal determiners.(25) He concludes that they should have no correlation among themselves, but would have a high correlation with the preference order. The following diagram illustrates a factorial pattern where three determiners lie on an orthogonal axis. (Non-zero loadings are represented by crosses).

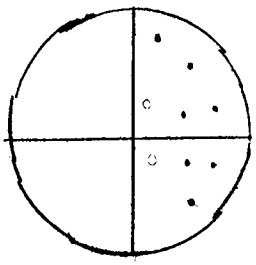
Factor Loading.

Person.	I	II	III
1	.	.	x
2	.	x	.
3	x	.	.
4	x	x	.
5	x	.	x
6	.	x	x
7	x	.	x
8	.	x	x
9	x	x	.

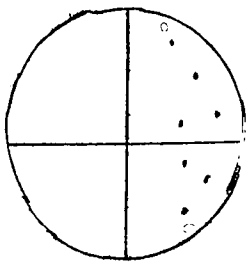


The requirements of the determiners are that they should lie on the orthogonal axes after they have been rotated (i.e. 1,2 and 3 correspond to determiners).

The diagram below, in which higher communalities with preference orders are shown by points nearer the circumference, illustrates poor and good determiners. The red points indicate determiners.



Poor Determiners.



Good Determiners.

The experiment which has been outlined might thus be described as a preliminary exploration of the field, that is, of the analysis of judgments of personality by using techniques of the type discussed. Since the population sampled would be very small, any conclusions would be tentative. At the same time however, some guidance might be gained as to the value of further investigation.

Chapter IV.

The Experimental Groups.

(i) Selected Groups of Children.
(ii) Teachers concerned in the Experiments.

(i) Selected Groups of Children.

The experimental data were obtained at a mixed Secondary Modern School at Fence Houses, County Durham, during the period from October 1947 to March 1948, with the co-operation of the teaching staff.

The children used in ranking, consisted of 26 boys and girls, aged 14-15 years, and formed the entire fourth year class at the time, the first set up in the school under the 1944 Education Act. While experiments were proceeding 2 children were absent from certain tests, and one left the school. For statistical purposes therefore, another child was omitted, the choice being made by lot. The children remaining formed parallel groups of 11 boys and 11 girls. General details of the groups are given below.

This class was selected from the available children on account of its general suitability for ranking. Numbers were small, and the children were well-known to the teachers. These children had attended the school longer than any others. They had been taught and

observed over a longer period than any others in the school. Owing to their greater age they behaved in a more mature manner than any other school group, and the teachers found their individual characteristics easier to distinguish; moreover, the precise composition of the class further assisted the judges. It had been formed by amalgamating the remnants of the third year A, B and C streams of 1946-7, and so included a wide range of intelligence and temperament.

As a first step, and estimate of the intellectud ability of these children was obtained by setting a non-verbal measure of observation. (Peel's Technical Selection Test). This was used rather than a verbal test, as the group included 2 non-readers. The following is condensed from the author's description of the test: "The test consists of three sub-tests. Two of them contain patterns in each of which there is a fault. The fault has to be found and marked with a cross. The third sub-test consists of items, each of which consist of pairs of patterns, identical save for a difference in the second pattern. This difference has to be found and marked with a cross. The test has a reliability of .843 (n = 468). Primarily designed as a test for technical selection, it has also a considerable 'g' saturation, as the following figures show.

Correlation between Peel's and Moray House Test .665

Correlation between Jenkins' Non-Verbal Intelligence and Moray House Test .589

Correlation between Peel's and Jenkins' Tests .582." (28)

DETAILS OF 22 SELECTED SCHOLARS.

BOYS.

Serial Letter	Age at 1.10.47.	School Stream	Intellectual Ability. Score	Age Norm.
a	14,5mths	A	123	112
b	14,2 "	C	96	110
c	14,5 "	B	76	112
d	14,5 "	C	94	112
e	14,3 "	C	86	110(x)
f	14,3 "	B	100	110
g	14,5 "	C	115	112
h	14,8 "	C	106	114(x)
i	14,5 "	C	80	112
j	14,2 "	B	127	110
k	14,2 "	B	78	110

GIRLS.

p	14,3 "	B	113	110
q	14,3 "	C	72	110
r	14,3 "	C	85	110
s	14,3 "	A	96	110
t	14,4 "	B	102	110
u	14,5 "	A	99	112
v	14,5 "	A	99	112
w	15.0 "	A	134	115
x	14,4 "	A	94	110
y	14,4 "	A	100	110
z	14,4 "	C	112	110

Notes: (x) indicates non-reader.
Age norms interpolated from Peel's data.
Scores standardised (m = 100: S.D = 15) to approximate to I.Q.

(ii) Teachers concerned in the Experiments.

7 men and 7 women teachers at the school were involved in various ranking experiments. Details of their teaching experience and knowledge of the selected children are given below. All had taught every selected child at some time within the previous $3\frac{1}{2}$ years, and had had numerous contacts with them inside the school, and beyond the classroom; e.g. during meals at school, club activities, games and sports.

DETAILS OF SELECTED TEACHERS.

MEN.

Total Number	Serial Letter	Teaching Experience	Experience of Selected Children.
		yrs.	yrs.
4	C,D, F,G.	20-40	$3\frac{1}{2}$
1	E	10-20	$3\frac{1}{2}$
1	A	5-10	2
1	B	$1\frac{1}{2}$	$1\frac{1}{2}$

WOMEN.

2	S,T.	20-30	$3\frac{1}{2}$
2	Q,R.	10-20	$3\frac{1}{2}$
1	U,	3	3
2	P,V.	1	$\frac{1}{2}$

Chapter V.

Ordering of Teachers' Preferences and Determiners.

(i) Ranking Procedure.
(ii) Choice and Ordering of Determiners.
(iii) Recapitulation.

(i) Ranking Procedure.

The aim of the first experiment was to obtain a reliable measure of the preference of the 14 teachers among the children. The method adopted was the ranking of the two groups of children in order of preference from one to eleven. In making these rankings the term "Likeability" was used to the teachers. This was loosely defined to them as the "impression made by the child on you"; and the ranker was asked to consider the questions:

(a) Which child would you choose to take with you on a holiday?

or (b) Which child would you choose to represent the school at a scout jamboree?

The wording was designed to elicit a personal preference from the teachers, regardless of what they might consider the conventional opinion. The rank-orders of these preferences were then considered.

The use of rank-orders as a measure involves the statistical assumption that the intervals between

positions are equal. If this is so, the results are distributed in a rectangular linear formation rather than the normal curve. Two procedures may be adopted to overcome the difficulty. The rank-orders can be transformed into equivalent normal deviates, as in Fisher and Yates' table XX. (29) Alternatively, as in Peel's work, the rank-orders can be forced into a normal distribution. (24,25) In the latter case however, 31 ranks were ordered.

In the present study, since the population is in any case low, any conclusion as to the distribution of preferences must be arbitrary. The conversion of rank-orders was not undertaken, on the ground that no greater accuracy would be gained by so doing.

Among the precautions taken to improve the quality of the rankings, the following may be mentioned.

(a) General discussion of ranking with the judges, and close observation of the selected class of children for 1 to 2 weeks.

(b) Individual discussions with each judge of the quality to be ranked.

(c) After carrying out (a) and (b), rankings were made and collected with the minimum of delay.

(d) A copy of the instructions for judges is given in Appendix B.

A complete list of teachers' preferences is

given in Appendix A. A second ranking was undertaken after four weeks' interval, and the results compared for repeat reliability. The full figures which are given in Appendix A show a high degree of repeat reliability.

From the original preferences correlation matrices were then worked out, by using Spearman's rank coefficient. $\rho = 1 - \frac{6\Sigma d^2}{n(n^2 - 1)}$

The matrices obtained are given in Table II overleaf. It will be noted that coefficients are given correct to the third decimal place. This is done throughout this study; but all were originally worked to the fourth place. The significance of these coefficients is discussed in Chapter VI.

(ii) Choice and Ordering of Determiners.

It was shown in Chapter III that determiners must be (a) psychologically satisfactory; i.e. objective and relevant to a theory of personality, and (b) statistically significant; i.e. approaching the conditions laid down for ideal determiners.

The following procedure was adopted in choosing possible determiners. The 31 personality variables stated by Allport to be normally distributed and clearly measureable were taken as a guide. (See Table I).

TABLE II.

RANK CORRELATIONS OF TEACHERS' PREFERENCES.

CRITERION - LIKEABILITY OF CHILDREN.

Men Teachers' Preferences for Boys.

	B	C	D	E	F	G
A	-427	-064	136	-055	264	155
B		391	546	446	446	364
C			809	473	573	746
D				709	791	709
E					500	336
F						818

Women Teachers' Preferences for Boys.

	Q	R	S	T	U	V
P	027	-046	100	109	296	459
Q		664	827	764	673	691
R			400	855	573	782
S				677	573	618
T					564	773
U						709

Men Teachers' Preferences for Girls.

	B	C	D	E	F	G
A	446	573	855	773	609	818
B		627	727	464	800	818
C			691	773	746	691
D				764	655	827
E					527	664
F						900

Women Teachers' Preferences for Girls.

	Q	R	S	T	U	V
P	346	564	636	491	282	746
Q		709	836	791	682	636
R			736	723	541	659
S				909	764	827
T					809	846
U						473

From his psychograph, 5 variables were selected as possible determiners of the teachers' preferences. After considering the criticism that such lists of common traits do not adequately indicate the dimensions of personality (which was discussed in the first chapter), and in view of Allport's ordering of the reliabilities of these traits (2,ch.xv), the following were selected :

i. Physique - Smartness of Appearance.

ii. Physique - Athletic Achievement.

iii. Intelligence.

iv. Attitude - Ascendance/Submission.

v. Attitude - Expansion/Reclusion.

To these was added, as a quality commonly invoked by teachers,

vi. Attitude - Commonsense.

These possible determiners were then measured, assessed for reliability, and examined for their significance as influences on the teachers' judgments. As the first step, quantitative measurements were made of these possible determiners. These were expressed as rank- orders. In some instances a performance test was used, and where this was unavailable, a system of ranking by experts was devised.

In the latter case, 6 teachers (3men and 3 women)

who had been in closest contact with the selected children, were considered as expert judges. These teachers observed the children over a period with a certain quality in mind. Their rankings were then made, and tabulated.

In evaluating these possible determiners by ranking, various techniques were used. In the case of Smartness of Appearance, the trait was clearly defined to the judges. When ranking Ascendancy/ Submission, the judges were given a 5 point descriptive scale in addition to the definition of the trait. Since the ranking of Common Sense and Expansion - Reclusion seemed likely to give difficulty a series of 11 suitable descriptive portraits was provided, and the judges were invited to base their rankings on this scale. Examples of the instructions are given in Appendix B.

To test the reliability of the judgments, the average rank-order was worked out. Giving the ranks a numerical value, the totals were added, and compared with the ideal value for the average rank-order, using the chi-squared test of goodness of fit. (30,pp.30-47) This of course involves the assumption that the rank-order can be given a numerical equivalent. The full calculations are given in Appendix A. A summary of the results is given overleaf.

Determiner.	Goodness of Fit.	
	Boys %	Girls %
1. Smartness of Appearance. "The general impression.. in respect of neatness of dress and bearing and cleanliness of person."	98	99
2. Ascendancy/Submission. Using a scale from "strong influence among the others good or bad, ringleader" to "easily persuaded by a stronger will."	80	90
3. Common Sense. Rankers were invited to match the children against descriptions.	60	73
4. Expansion-Reclusion. Matching against descriptions.	45	52

It was therefore considered that the first two had been established, subject to statistical considerations. It is noteworthy that the judges agreed most on a quality clearly seen and overt. In the case of Ascendancy/Submission judgement was possibly aided by a clear scale of rating. In the cases of the more covert traits agreement was naturally less.

Other possible determiners were examined. These were derived from tests or known facts about the children, and were expressed as rank-orders. They were

the following:

Determiner	Data
1. Intellectual Ability.	Peel's Technical Selection Test. (See Chap.IV)
2. Athletic Achievement.	Tests of running, (100 and 400 yds): high jump: swimming: against age-norms.
3. Attendance.	Casual absenteeism, from $\frac{1}{2}$ to 2 days, reckoned from the pupil's attendance record.
4. Income Group.	Parent's income extracted from School Meal Form.

It will be noted that two variables (Attendance and Income Group) have been added to the possible traits already discussed. These details had been collected for another purpose. Though these variables are unconnected with the traits under consideration, it seemed desirable to test the hypothesis that the teachers' preferences might be influenced by either their pupil's attendance or the financial standing of their paremts. Comparison however, showed consistently low correlations with both the teachers' preferences and the other determiners, and these variables were discarded as valueless.

The remaining possible determiners were then compared with each other, and with the criteria to examine their statistical value. The results are given in Table III.

TABLE III.

INTERCORRELATIONS OF DETERMINERS AND CRITERION.

Determiners.	DETERMINERS			CRITERION	
	Smart Appearance	Ascendancy/ Submission.	Athletic Achievement.	Preferences of	
				Men	Women
Intellectual Ability.					
-Boys.	064	282	-352	564	616
-Girls.	324	-246	-416	300	502
Smart Appearance.					
-Boys.	-	609	182	309	084
-Girls.	-	221	-252	839	664
Ascendancy/ Submission.					
-Boys.	-	-	061	364	171
-Girls.	-	-	486	018	-239
Athletic Achievement.					
-Boys.	-	-	-	-336	-669
-Girls.	-	-	-	-105	-180

Ideal determiners would have no inter-correlations, and would have a value of 1 when compared to the criteria. It is seen that Intellectual Ability has low inter-correlations with all the other determiners, and fairly high correlations with three groups of teachers' preferences. Smart Appearance has low intercorrelations with the other determiners (excepting Ascendancy/Submission), and high correlations with two groups of preferences. The remaining two determiners are less significant compared to the preferences, and of them, only Ascendancy/Submission has a positive relation. The first three determiners were therefore adopted as the most objective and significant.

Apart from their statistical value, the psychological relevance of these determiners must be considered. To use them implies that the teachers' preferences of persons can be described in terms of Intelligence, Physical Appearance, and a temperamental quality. Such weightings are in harmony with the common traits emphasised in the structural approach of such writers as Allport. (See Table I)

(iii) Recapitulation.

Teachers' likings among selected groups of boys and girls were obtained and inter-correlated. Three objective determiners of these likings were evolved and

tested for statistical and psychological significance. These were:

(a) Intellectual Ability.

(b) Smartness of Appearance.

(c) Ascendancy/Submission.

Chapter VI.

Statistical Treatment of the Data.

(i) Factor Analysis of Matrices.
(ii) Analysis of Matrix of Persons and Determiners.
(iii) Correlations of Preferences and Determiners.
(iv) Regression Estimates of Preference Factors.
(v) Multivariate Analysis of the Group Preference.

(i) Factor Analysis of Matrices.

An analysis of the four matrices (RL) was carried out, using Thurstone's centroid method. The factors obtained are tabulated below.

TABLE IV.

PREFERENCE FACTORS.

Persons	Men on Boys.		Men on Girls.	
	I	II	I	II
A	058	586	829	421
B	491	-499	791	-382
C	795	-131	820	-039
D	959	-121	904	240
E	663	-332	797	319
F	895	340	864	-410
G	840	295	945	-125

	Women on Boys.		Women on Girls.	
P	268	-597	655	-505
Q	853	316	832	285
R	779	217	803	-082
S	767	179	966	077
T	876	310	942	193
U	781	-181	750	452
V	918	-270	865	-296

Significance of the Factors.

The parent correlations were subjected to three tests of significance. In order of stringency, these were:

(i) Reference to Standard Error, using the formula

$$\frac{1.05\ (\ 1-r\ )}{N} \qquad (30,p.248)$$

(ii) Estimation of Significance, converting to 't' measure. This measure was devised by "Student" for use with small random samples. His formula is:

$$t = \frac{r}{1-r^2} \cdot N - 2$$

A table is given by Lindquist showing the significance of 't' at the 1% and 5% levels. (30,p.212)

(iii) Estimation of Standard Error, converting to 'z' measure by the formula:

$$z = \tfrac{1}{2} \log_e \frac{1+r}{1-r} \qquad (31,p.20)$$

$$S.E_z = \frac{1}{N-3} \quad (.354 \text{ for this population})$$

A conversion table is given by Lindquist. (30,p.215)

Both (ii) and (iii) were designed for use with product-moment coefficients: used with Spearman's rank-order coefficients they have been assumed to give a good approximation. In addition the matrix of first factor residuals was examined by comparison of the residuals with the S.E. of the parent correlation coefficients. The results of these tests are summarised overleaf.

Test.	Men on Boys.	Men on Girls.	Women on Boys.	Women on Girls.
1. Coefficients: % over 2 x S.E.	43	90	66	81
2. 't' units: % significant at (a) 1% level.	14	38	19	29
(b) 5% level.	28	66	48	71
3. 'z' units: % over 2 x S.E.	29	81	52	71
4. F.F residuals: (a) over 2 x S.E.	-	-	1:21	-
(b) over $1\frac{1}{2}$x S.E.	1:21	-	2:21	-

There was thus evidence of significant first and second factors in the case of Women on Boys. In the remaining cases, two factors have been used, though they cannot be regarded as of proved significance.

(ii) Analysis of the Matrix of Persons and Determiners.

The next process was to analyse into centroid factors the complete matrix r, inclusive of both persons and determiners. The data for this matrix is given in Tables II and VII. Factors are thus obtained which are common to both. It is then possible to utilise the determiner loadings as a guide to the rotation of the factors. This may assist the process of interpretation. The factor loadings are tabulated overleaf.

TABLE V.

ANALYSIS OF COMPLETE MATRIX R.

(INCLUSIVE OF PERSONS AND DETERMINERS).

Person or Determiner.	Men on Boys. I	Men on Boys. II	Men on Girls. I	Men on Girls. II
A	019	781	840	253
B	641	-538	751	-154
C	753	065	819	-336
D	895	285	890	-144
E	533	170	791	-195
F	914	214	883	116
G	833	121	937	267
Intellect	623	273	350	-479
Appearance	406	-766	918	177
Asc./Subm.	535	-498	070	642

	Women on Boys.		Women on Girls.	
P	048	683	670	-228
Q	853	188	854	-112
R	856	-246	769	143
S	703	337	955	-171
T	930	-113	913	169
U	754	343	765	402
V	891	320	853	-216
Intellect	754	-111	484	236
Appearance	190	-537	733	347
Asc./Subm.	352	-752	-203	615

Significance of the Factors.

The four tests described on page 59 were applied to these figures. The results are given overleaf.

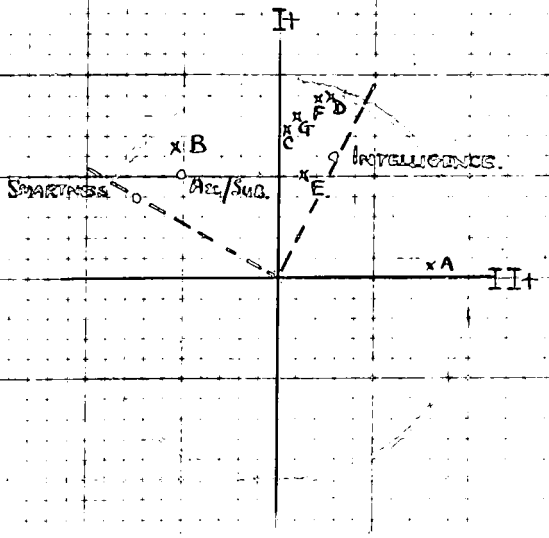
Test.	Men on Boys.	Men on Girls.	Women on Boys.	Women on Girls.
1. Coefficients: % over 2 x S.E.	40	60	47	56
2. 't' units: % significant at (a) 1% level.	7	27	14	20
(b) 5% level.	18	47	31	44
3. 'z' units: % over 2 x S.E.	22	51	36	44
4. F.F residuals: (a) over 2 x S.E.	3:45	-	3:45	1:45
(b) over $1\frac{1}{2}$xS.E.	6:45	1:45	6:45	2:45

Thus there was evidence of significant first and second factors in two cases - Men on Boys and Women on Girls. Factors have been worked in the other two cases, though they cannot be regarded as significant.

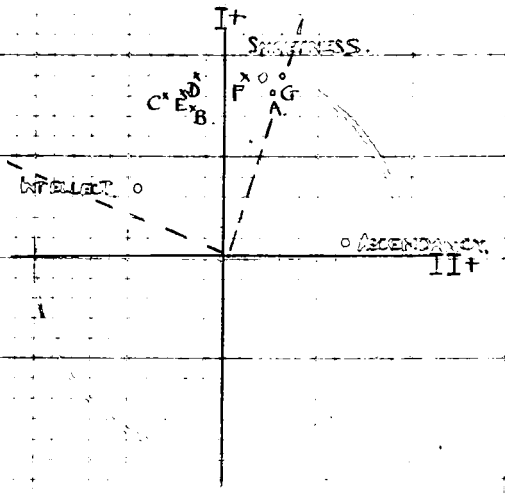
Graphical Presentation of the Factor Pattern.

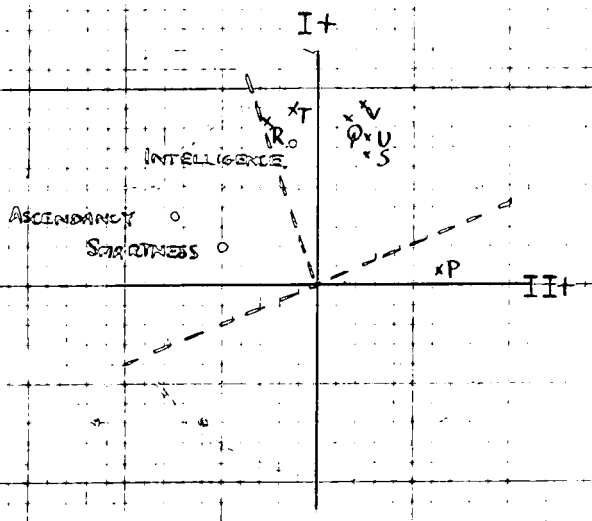
The value of the determiner loadings in finding psychological meaning for the factorial pattern is clearly seen in a graphical presentation. In the following diagrams persons are indicated in black, and determiners in red. The vectors of the determiners give a psychologically significant position for the axes.

Men on Boys.

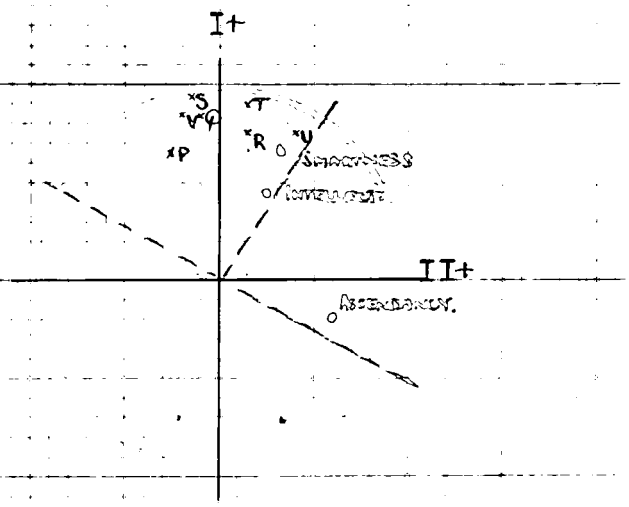


Men on Girls.





Women on Boys.



Women on Girls.

The factors were then rotated on a suitable determiner, after studying the graphical pattern. The results are given in Table VI.

TABLE VI.

ROTATED FACTORS OF COMPLETE MATRIX R.

Person or Determiner.	Men on Boys. I	Men on Boys. II	Men on Girls. I	Men on Girls. II
A	295	700	885	0
B	390	-750	660	-370
C	720	-240	695	-575
D	925	-080	810	-400
E	570	-050	720	-370
F	930	-170	870	-140
G	825	-210	975	-030
Intellect	680	0	200	-565
Appearance	080	-880	940	-100
Asc./Subm.	345	-640	270	620

	Women on Boys.		Women on Girls.	
P	0	640	525	-490
Q	820	305	740	-470
R	880	-120	775	-200
S	665	430	815	-560
T	940	040	915	-240
U	685	455	865	060
V	820	465	685	-560
Intellect	770	0	485	-080
Appearance	255	-495	820	0
Asc./Subm.	430	-685	020	580

When referred to the centroid axes, the loadings reveal a general factor and a bipolar factor. Reference to the positions of the determiners gives a more significant position for the axes. These are now shown as two

orthogonal vectors, which are of psychological interest. In three cases, both factors are now general, and in one a general and bipolar factor are present. Each group of persons has preferences bounded by extremes, which can be described as follows:

Group.	Range.	Remarks.
Men on Boys	Smartness-Intellect	Most prefer Intellect to Smartness.
Men on Girls	Smartness-Intellect	Most prefer Smartness to Intellect.
Women on Boys	Submission or Smartness-Intellect	A more difficult pattern to interpret. General and bipolar factor when rotated. Most more influenced by Intellect than the general factor.
Women on Girls	Ascendancy-Intellect	Preferences spread evenly over the entire range.

It will be noted that one determiner has been disregarded in this procedure. Since two factors only were taken out from each matrix of preferences, the two most significant determiners were selected for rotation. The pattern formed by ideal determiners was discussed in Chapter III.

(iii) Correlation of Preferences and Determiners.

An alternative treatment of the preferences is to form the matrix R_0, by calculating the correlation coefficients between the orders according to the teachers' preferences and the determiners. These coefficients are given in Table VII.

TABLE VII.

PREFERENCE-DETERMINER CORRELATIONS.

Person.	Men on Boys.			Men on Girls.		
	Intell-ect	Appearance	Asc./Subm.	Intel-lect	Appear-ance	Asc./Subm.
A	527	-609	-336	057	891	180
B	246	709	518	316	555	-125
C	256	136	509	498	646	-075
D	546	209	246	325	846	-089
E	127	082	-046	334	746	-080
F	682	346	391	325	700	243
G	427	246	509	107	836	234
	Women on Boys.			Women on Girls.		
P	-146	-409	-546	039	764	-193
Q	668	100	155	552	336	-421
R	759	118	455	293	664	089
S	368	-027	082	384	555	-321
T	659	173	455	425	655	-016
U	768	-118	-036	507	664	025
V	577	082	164	161	768	-180

Regression coefficients were then obtained, using the method recommended by Thomson, which enables the standard error to be found quickly. (32, pp.348-351) The teachers' preference is then expressed as a weighted sum of the determiners. (See Table VIII below).

TABLE VIII.

REGRESSION COEFFICIENTS OF TEACHERS' PREFERENCES ON DETERMINERS.

Men Teachers ' Preferences for Boys.

Person.	Intellect	Appearance	Ascendancy/ Submission.	Maximum Correl.
A	613	-537	-182	844
B	185	657	066	739
C	090	-261	643	561
D	539	187	-022	582
E	176	204	-220	202
F	654	283	034	746
G	302	-051	455	590

Men Teachers' Preferences for Girls.

A	-303	1.016	-119	948
B	068	585	-237	613
C	274	587	-137	723
D	-052	930	-307	866
E	-014	736	-252	846
F	162	615	034	721
G	-188	901	455	855

Women Teachers' Preferences for Boys.

P	-005	-123	-469	554
Q	694	128	-119	669
R	669	-137	350	786
S	368	-060	014	372
T	569	-068	336	718
U	845	-008	270	812
V	586	072	-046	624

Women Teachers' Preferences for Girls.

P	-419	1.010	-519	927
Q	353	311	-402	684
R	074	648	-036	670
S	071	629	-441	717
T	201	612	-101	698
U	462	176	050	540
V	-257	947	-451	873

Significance of Regression Coefficients.

This can be tested by a method suggested by Thomson. (32,pp.350-1) The reciprocal of the matrix between the preferences and the regression coefficients is formed. This had already been done in the process of calculating these coefficients. Then, whatever the person, the variances and co-variances of the regression coefficients are proportional to the cells of the reciprocal matrix. Their absolute value is obtained by the formula:

$$\text{Variance} = \frac{\text{cell of } R^{-1}}{\text{degree of freedom}} \cdot 1 - r^2$$

$$\text{S.E. of Regression Coefficient} = \sqrt{\text{Variance}}$$

Applying this method the following results were obtained:

Person.	Men on Boys.			Men on Girls.		
	Intellect	Appearance.	Asc./Subm.	Intellect.	Appearance.	Asc./Subm.
A	2xS.E	-	-	-	3xS.E	-
B	-	-	-	-	-	-
C	-	-	-	-	-	-
D	-	-	-	-	3xS.E	-
E	-	-	-	-	2xS.E	-
F	2xS.E	-	-	-	-	-
G	-	-	-	-	3xS.E	-

	Women on Boys.			Women on Girls.		
P	-	-	-	-	3xS.E	-
Q	-	-	-	-	-	-
R	-	-	-	-	-	-
S	-	-	-	-	-	-
T	-	-	-	-	-	-
U	2xS.E	-	-	-	-	-
V	-	-	-	-	3xS.E	-

It will be noted that this is largely a check on the population employed. Thus, if Men and Women are considered together, forming a population of 14 teachers, the following level of significance is obtained:

On Boys: 25% exceed 3 x S.E : 40% exceed 2 x S.E.

On Girls: 33% " " : 50% " "

The pattern of regression coefficients will be compared with the factorial patterns already obtained, at a later stage.

(iv) Regression Estimates of Preference Factors.

A method has been devised by Peel of estimating the factors which characterise the preferences of the groups of persons as a whole, in terms of the determiners. (25,pp.104-112;26) Again then, it is possible to express an estimate of personal preferences in terms of objective qualities, considering this time the group of judges as a whole.

The estimate is given by the equation:

$$\hat{f}_o = M'_{LO}\, R_L^{-1}\, R$$

where M_{LO} = matrix of first and second preference factors.

R_L^{-1} = matrix of preference intercorrelations, pivotally condensed: $\frac{R_L \mid -1}{1 \mid}$: until entries to the left of the vertical line have been cleared.

R_O = matrix of regression coefficients.

This procedure entailed a calculation of the following type, for each group of teachers.

$$M'_{LO} \quad R_L\text{-}1 \quad R_O$$

$$\begin{bmatrix} xxxxxxx \\ xxxxxxx \end{bmatrix} \begin{bmatrix} xxxxxxx \\ xxxxxxx \\ xxxxxxx \\ xxxxxxx \\ xxxxxxx \\ xxxxxxx \\ xxxxxxx \end{bmatrix} \begin{bmatrix} xxx \\ xxx \\ xxx \\ xxx \\ xxx \\ xxx \\ xxx \end{bmatrix} = \begin{bmatrix} f_i & x & x & x \\ f_{ii} & x & x & x \end{bmatrix}$$

The results are given in the following table. It will be noted that in the second case (Men on Girls) one factor only has been estimated. The reasons for this are given in Appendix C.

TABLE IX.

REGRESSION ESTIMATES OF GROUP FACTORS.

Men Teachers' Preferences for Boys.

Factor.	Intellect	Appearance	Ascendancy/ Submission.
I	-523	054	-062
II	955	-422	755

Men Teachers' Preferences for Girls.

(see above)	-777	761	-081

Women Teachers' Preferences for Boys.

I	-636	561	-273
II	-066	-918	293

Women Teachers' Preferences for Girls.

I	082	705	-315
II	804	-652	431

These estimates were then rotated on a suitable determiner to enhance their psychological significance, using the matrix

$$\begin{matrix} \cos\phi & \sin\phi \\ -\sin\phi & \cos\phi \end{matrix}$$

where ϕ is the angle of rotation, and the values of sin ϕ and cos ϕ are obtained from the formula

$$\sin^2\phi = \frac{a^2}{a^2 \quad b^2}$$

when a and b are the first and second factor weightings of the chosen determiner.

This rotation has not been applied in the case of Men Teachers' Preferences for boys, where the general factor estimation has been repeated.

TABLE X.

ROTATED REGRESSION ESTIMATES OF GROUP FACTORS.

Men Teachers' Preferences for Boys.

Factor.	Intellect	Appearance	Ascendancy/ Submission.
I	1.089	-396	710
II	0	155	-318

Men Teachers' Preferences for Girls.

(see above)	-777	761	-081

Women Teachers' Preferences for Boys.

I	650	-450	230
II	0	980	-320

Women Teachers' Preferences for Girls.

I	-486	961	523
II	646	0	103

(v) Multivariate Analysis of Group Preferences.

An alternative technique for the analysis of the group preference would be to treat the problem as one of multivariate analysis. The method recently described by Peel, could be applied to the batteries of correlations of teachers' preferences and determiners. (33).

In this technique, test weights are chosen for a battery of tests to give maximum prediction of a complex external criterion, formed from a number of assessments. The following is Peel's summary of his technique. "The test weights $\underline{w}$, which give maximum prediction of an external complex criterion, formed from a battery of assessments weighted arbitrarily by the vector of weights $\underline{u}$, can be calculated by the equation

$$w' = u' R_{ab} R_{bb}^{-1}$$

where the assessments are the $\underline{a}$ variates and the predicting tests are the $\underline{b}$ variates.

The maximum correlation is given by the formula

$$r = \frac{u' R_{ab} R_{bb}^{-1} R_{ba} u}{u' R_{aa} u} \quad \text{." (33)}$$

In applying the technique to the present problem, the external criterion is formed by the teachers' orders of personal preferences, and is weighted arbitrarily by the vector $\underline{u}$. The battery of tests is then formed

by the ordering of the three determiners, (Intelligence, Smartness of Appearance, Ascendancy/Submission), for which the weighting $\underline{w}$, which will give maximum prediction, is to be found.

The orders of personal preferences have been equally weighted in this procedure, as it is considered impossible to assign any other than equal value among the judgments of the group of teachers.

The case of Men on Boys will be analysed in detail to illustrate the method.

As the first step, a battery of correlation coefficients is formed, as follows:

	w°	u°
w°	bb	ba
u°	ab	aa

(see Tables II and VII).

The battery is shown in full in Table XI, on the next page.

From the matrix $R_{ab}R_{bb}$ the matrix $R_{ab}R_{bb}^{-1}$ is evaluated, using Aitken's method of pivotal condensation (see page 69). The full calculation is given in Appendix D. Giving $\underline{u}^\circ$ the weighting (1:1:1:1:1:1:1), the weightings $\underline{w}^\circ$ are found by summation of the columns of the final matrix.

The calculation of the maximum correlation is then

TABLE XI.

MULTIVARIATE ANALYSIS.

BATTERY OF CORRELATION COEFFICIENTS.

	w^{i}	w^{ii}	w^{iii}	u^{i}	u^{ii}	u^{iii}	u^{iv}	u^{v}	u^{vi}	u^{vii}
w^{i}	1	064	282	527	246	256	546	127	682	427
w^{ii}	064	1	609	-609	709	136	209	082	346	246
w^{iii}	282	609	1	-336	518	509	246	-046	391	509
u^{i}	527	-609	-336	1	-427	-064	136	-055	264	155
u^{ii}	246	709	518	-427	1	391	546	446	446	364
u^{iii}	256	136	509	-064	391	1	809	473	573	746
u^{iv}	546	209	246	136	546	809	1	709	791	709
u^{v}	127	082	-046	-055	446	473	709	1	500	336
u^{vi}	682	346	391	264	446	573	791	500	1	818
u^{vii}	427	246	509	155	364	746	709	336	818	1

undertaken. The upper term of Peel's formula ($w' R_{ab}^{-1}$), is first evaluated. This involves a calculation of the following type:

$$\underline{w'} \qquad \underline{R_{ba}} \qquad \underline{u}$$

$$\begin{bmatrix} x \\ x \\ x \end{bmatrix} \quad \begin{bmatrix} x & x & x & x & x & x \\ x & x & x & x & x & x \\ x & x & x & x & x & x \end{bmatrix} \quad \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

The lower term is found by the calculation:

$u' R_{aa}^{-1}$.

$$\underline{u'} \qquad \underline{R_{aa}} \qquad \underline{u}$$

$$\begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} \quad \begin{bmatrix} x & x & x & x & x & x \\ x & x & x & x & x & x \\ x & x & x & x & x & x \\ x & x & x & x & x & x \\ x & x & x & x & x & x \\ x & x & x & x & x & x \\ x & x & x & x & x & x \end{bmatrix} \quad \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$$

In the selected case, the results were as follows:

Men on Boys.

Weightings.			Max. Corr.
Intelligence w^i	Smartness w^{ii}	Asc./Subm. w^{iii}	r
2.561	.484	.772	.612

These weightings represent an arithmetical ratio, and may, for convenience, be scaled down. To assist comparison with the estimate of group preference given in the previous section, they can be re-expressed as follows:

w^i	w^{ii}	w^{iii}
1.0	.2	.3

The rotated estimates for this group, given on page 71, are repeated for convenience of comparison.

Factor.	Intellect	Appearance	Ascendancy/ Submission.
I	1.089	-396	710
II	0	155	-318

It will be seen that the relative weightings of the three determiners is similar in both calculations. The results of the other three Cases are given below. It will be seen that one determiner has tended to attract much of the total correlation, while the smallest determiner has shrunk in significance. In each case, however, the order of importance of the determiners corresponds to that estimated by the formula

$$\hat{\hat{f}} = M'_{LO} R_L^{-1} R_O \qquad \text{(see page 69).}$$

The weightings, with the largest determiner expressed as unity, are given below.

	Intell.	Smartness	Asc./Subm.	r
Men on Girls.	-002	1	-.2	.875
Women on Boys.	1	.08	.03	.702
Women on Girls.	.08	1	-.4	.810

In this chapter, then, the data has been examined by four distinct statistical methods, both from the point of view of the individual preferences, and with regard to the preferences of the groups of teachers as a whole. These results will be further discussed in the next chapter.

Chapter VII.

Results and Conclusions.

The aims of this investigation were two-fold. It was intended, firstly, to examine the possibility of applying certain techniques to the analysis of judgments of personality. Should these methods be found appropriate, it was hoped that light might then be thrown on the subject of the value of personal preference.

A discussion of the results obtained must begin with the limitations of the experiments. Considering preliminary work such as this, the small scale on which it was conducted at once rules out any far-reaching conclusions. Statistically, these limitations, which were described at each stage, place much of the data below accepted standards of significance. It has been shown that, by raising the pupil groups from eleven to, say, twenty-two in population, much more significant figures might have been obtained. On the other hand, since certain of the data, even with the population used, can be regarded as significant, there appears to be some evidence of a positive nature.

Four methods of approach were used: (A) a factorial analysis of preferences and determiners; (B) the calculation of regression equations on the

preference in terms of the determiners; (C) an estimation of the factors underlying the preferences of the entire group of judges; and (D) a multivariate analysis of the group preference. A summary of the results is given on the next page for convenience. (Table XII).

Comparison of these results shows the presence of certain factorial patterns. The factorisation of the matrix inclusive of persons and determiners (A), permits the rotation of the factors on two orthogonal axes of psychological significance. When this is done, the personal loadings appear as coefficients of two general orthogonal axes.

An alternative procedureis to compare the original factors entering into the teachers' preferences with the regression coefficients of the teachers on the determiners. (B). When this is done, the factor preferences appear to be linked with two determiners, which in most cases are similar to those obtained by the first procedure. This method of treating the data was carried out at a lower level of statistical confidence, than in procedure (A).

An estimation of the group factorial weightings, (C), suggests a similar identification of factors in two cases. This estimate possibly involves a more refined mathematical treatment than is justified by this data.

TABLE XII.

IDENTIFICATION OF FACTOR LOADINGS.

Description.	Men on Boys.	Women on Boys.	Men on Girls.	Women on Girls.
(A) Rotated -I Inclusive Factors.-II (Table VI).	Intellect Smartness[x] or Ascendancy	Intellect Smartness (-ve) or Submission	Smartness Intellect[x] or Submission	Smartness Submission[x]
(B) Factors -I and Reg. Coeffs.-II (IV & VIII)	Intellect Smartness	Intellect Ascendancy	Smartness Intellect	Smartness Intellect or Ascendancy
(C) Estimates -I of Group Preference (Table X)	Intellect and Ascendancy	Intellect	Smartness (Very High)	Smartness
-II	Smartness	Smartness		Intellect
(D) Multi- (z) variate Analysis. (Table XI)	Intellect Ascendancy Smartness	Intellect (Smartness (Asc/Sub. -Both Low.	Smartness Submission	Smartness Submission

Notes. 1. Underlined terms indicate a significant second factor.
2. x indicates a factor orthogonal to the first factor.
3. z - determiners given in order of importance.

Multivariate analysis (D), by means of which an alternative examination of the group preference was made, gave in one case, results strikingly similar to those obtained by procedure (C). In the other three cases, a broad similarity was apparent.

Taken as a whole, therefore, the factorial patterns obtained from the data, while not conclusive, sufficiently resembled each other to suggest that these preferences, examined by such procedures, can be explained in psychologically significant terms. A further piece of supporting evidence is the fact that, when examining possible determiners, variables which had no direct connection with personality traits, such as Parent's Income and Habitual Absence, (see page 54), were found to have insignificant correlations with the preferences.

The experience gained from these preliminary experiments suggests a wide field of further work, to confirm more definitely, or to reject, the hypothesis which has been put forward. In general, a larger experimental population is needed. This would enable more accurate statistical analyses to be made, at a higher level of significance. Peel, using a test of 31 items, forced rank orders into a normal distribution, thus enabling him to use product-moment correlation coefficients, and to apply the analysis of variance,

which is particularly suitable to the examination of small samples. This number of items probably represents the upper limit in respect of which rankings of value can be obtained.

Another necessary experiment would be to test the degree to which a group of judges use identical determiners in their preferences of different groups within one environment, and to examine their attitudes to different age-groups. Such a study could conveniently be undertaken in schools.

Worthwhile investigations, using these techniques, could be made into the possibility of obtaining determiners more nearly approaching to the ideal conditions postulated. Possibly standardised tests might be preferable in some cases to the procedure of treating agreement among judges as a test of an objective ranking in respect of a quality. At the time of this investigation, it was not possible to use the Downey Will-Temperament Test, for instance. In this study, too, considerable difficulty was found in establishing three determiners, which should be highly correlated to the preferences of all the groups of teachers.

In conclusion, therefore, it may be said that the present small scale investigation, which was carried out as a preliminary attempt to attack a problem of

personality assessment, gives some support to the theory that a personal preference can be explained in terms of the objective psychological traits of the person judged. Further investigation may give greater evidence on this issue, and provide a link between the intuitive preference of the ordinary man, and the analytical approach through trait assessment. If this were found to be so, important practical implications follow. Thus, it would be possible to devise a means of weighting the judgments of members of selection boards and tribunals in terms of previously known determiners, using similar techniques to those explored in this study. Much experimental work would need to be done before full acceptance can be extended to this hypothesis.

Appendix A.

Rank Orders of Preferences and Determiners.

In this appendix are tabulated the teachers' orderings of the children in respect of "Likeability", together with a repetition after approximately three weeks. The correlations between their first and second rankings of the children are also shown.

The rankings of the children in respect of the determiners "Smartness of Appearance" and "Ascendancy-Submission" are also given, together with the calculation from these orders, of the value of chi-squared.

(1)

Ordering of Boys for Likeability.

	Men Teachers.								Women Teachers.							
	A	B	C	D	E	F	G	Ave.	P	Q	R	S	T	U	V	Ave.
a	3	2	1	1	2	1	3	1	11	1	1	1	1	3	3	1
b	5	8	4	6	10	6	2	6	8	8	3	11	5	10	8	9
c	8	10	7	9	3	8	8	8	1	7	8	4	4	8	6	5
d	4	6	11	8	7	5	7	7	7	3	7	5	7	7	7	6
e	6	7	10	10	8	9	9	10	2	9	6	9	9	6	4	7
f	7	1	3	2	1	3	1	2	3	2	4	3	3	5	1	1
g	1	11	5	5	9	4	4	5	6	4	5	2	6	2	5	4
h	2	9	9	7	6	10	11	9	4	6	9	7	8	4	9	8
i	11	4	8	11	11	11	10	11	10	10	10	10	10	11	11	11
j	9	3	6	4	5	2	5	3	5	5	2	6	2	1	2	3
k	10	5	2	3	4	7	6	4	9	11	11	8	11	9	10	10

(2)

Ordering of Girls for Likeability.

	Men Teachers.								Women Teachers.							
	A	B	C	D	E	F	G	Aver.	P	Q	R	S	T	U	V	Aver.
p	8	1	1	5	6	1	4	4	4	2	2	3	5	3	7	3
q	10	10	9	10	9	10	11	11	10	10	11	11	10	10	10	11
r	9	5	11	8	10	9	8	8	7	9	10	9	11	11	8	10
s	5	9	5	9	4	5	6	6½	8	6	4	4	4	5	6	6
t	11	8	10	11	11	7	9	10	11	8	8	10	8	4	11	9
u	4	6	7	4	3	6	5	5	3	4	3	6	6	9	4	5
v	2	3	2	1	2	3	2	1	5	1	1	2	1	2	1	1
w	3	2	3	2	1	4	3	2	6	5	6	5	3	6	3	4
x	1	4	6	3	7	2	1	3	1	11	5	7	7	7	5	7
y	6	7	4	6	5	8	7	6½	2	3	7	1	2	1	2	2
z	7	11	8	7	8	10	11	9	9	7	9	8	9	8	9	8

(3)

Second Ordering of Boys for Likeability.

a	3	3	1	1	3	1	2	11	1	1	1	1	3	6
b	6	5	4	7	10	5	4	6	8	4	11	5	10	8
c	7	9	7	8	2	6	7	1	7	7	4	4	8	3
d	4	7	11	9	8	7	8	9	3	6	5	7	7	7
e	8	6	10	10	7	9	10	3	9	8	9	9	6	5
f	5	1	3	2	1	3	1	2	2	5	3	3	5	1
g	1	11	5	6	9	4	3	8	4	3	2	6	2	4
h	2	10	9	5	5	10	11	4	6	9	7	8	4	9
i	10	3	8	11	11	11	9	10	10	10	10	10	11	11
j	9	4	6	4	6	2	6	5	5	2	6	2	1	2
k	11	8	2	3	4	8	5	7	11	11	8	11	9	10

(4)

Second Ordering of Girls for Likeability.

p	10	1	1	7	6	1	4	6	2	3	3	7	3	6
q	9	10	11	10	9	11	10	10	10	10	11	10	10	10
r	8	5	8	9	10	7	8	9	9	11	9	11	11	7
s	4	9	4	8	4	4	6	5	6	2	4	2	4	8
t	11	8	10	11	11	9	9	11	8	6	10	9	5	11
u	3	6	5	2	3	3	5	3	4	4	6	6	8	4
v	2	3	3	1	2	2	2	4	1	1	2	1	2	1
w	5	2	2	3	1	5	3	7	5	8	5	3	6	5
x	1	4	9	4	7	6	1	1	11	5	7	8	7	2
y	7	7	6	6	5	8	7	2	3	9	1	4	1	3
z	6	11	7	5	8	10	11	8	7	7	8	5	9	9

(5)

Intercorrelations of First and Second Rankings.

A	B	C	D	E	F	G	P	Q	R	S	T	U	V
Men on Boys.							Women on Boys.						
927	891	1.0	964	973	955	941	918	1.0	945	1.0	1.0	896	959
Men on Girls.							Women on Girls.						
936	1.0	800	927	1.0	791	790	905	1.0	891	1.0	818	982	909

(6)

Ordering of Determiner "Smartness of Appearance."

Boys.

	H	I	J	K	L	M	Total (fo)	Av. Pos.	ft	d	d^2	$\frac{d^2}{ft}$
a	6	6	6	6	3	7	34	6	36	2	4	.11
b	8	8	7	7	9	6	45	7	42	3	9	.21
c	7	7	9	8	8	9	48	8	48	-	-	-
d	2	3	2	5	5	4	21	3	18	3	9	.50
e	10	9	10	10	10	10	59	10	60	1	1	.02
f	4	4	5	2	4	3	22	4	24	2	4	.17
g	9	10	8	9	7	8	51	9	54	3	9	.17
h	11	11	11	11	11	11	66	11	66	-	-	-
i	5	2	3	3	1	2	16	2	12	4	16	1.33
j	1	1	1	1	2	1	7	1	6	1	1	.17
k	3	5	4	4	6	5	27	5	30	3	9	.30

Chi-squared = 2.98. For 10 d.f. this value would be exceeded in 98.5% random samples.

Girls.

p	8	6	7	6	4	6	37	6	36	1	1	.03
q	11	9	10	10	10	10	60	10	60	-	-	-
r	10	11	9	9	11	11	61	11	66	5	25	.38
s	6	8	5	7	7	8	41	7	42	1	1	.02
t	9	10	8	11	9	9	56	9	54	2	4	.08
u	3	3	3	3	5	4	21	3	18	3	9	.50
v	4	5	4	4	6	3	26	4	24	2	4	.17
w	1	2	2	2	2	2	11	2	12	1	1	.08
x	2	1	1	1	1	1	7	1	6	1	1	.17
y	5	4	6	5	3	5	28	5	30	2	4	.14
z	7	7	11	8	8	7	48	8	48	-	-	-

Chi-squared = 1.57. 99% random samples exceed (10 d.f.).

(7)

Ordering of Determiner
"Ascendancy - Submission."
Boys.

	H	I	J	K	L	Total (fo)	Av. Pos.	ft	d	d^2	$\frac{d^2}{ft}$
a	1	1	4	1	2	9	2	10	1	1	.10
b	4	3	8	3	5	23	4	20	3	9	.45
c	5	7	5	9	9	35	7	35	-	-	-
d	9	8	9	6	10	42	9	45	3	9	.20
e	11	10	10	11	3	45	10	50	5	25	.50
f	6	4	6	8	6	30	5	25	5	25	1.0
g	7	6	7	5	7	32	6	30	2	4	.13
h	10	9	11	7	11	48	11	55	7	49	.90
i	2	2	1	2	1	8	1	5	3	9	1.80
j	3	5	3	4	4	19	3	15	4	16	1.0
k	8	11	2	10	8	39	8	40	1	1	.03

Chi-squared = 6.11. For 10 d.f. this value would be exceeded in 80% random samples.

Girls.

p	7	8	9	9	6	39	$8\frac{1}{2}$	$42\frac{1}{2}$	$3\frac{1}{2}$	$12\frac{1}{2}$	.29
q	2	2	7	5	1	17	3	15	2	4	.27
r	11	11	11	11	11	55	11	55	-	-	-
s	4	4	3	4	4	19	4	20	1	1	.05
t	3	1	2	3	2	11	2	10	1	1	.10
u	8	7	8	6	9	38	7	35	3	9	.27
v	6	5	4	7	5	27	5	25	2	4	.16
w	5	10	5	2	7	29	6	30	1	1	.03
x	1	3	1	1	3	9	1	5	4	16	3.20
y	10	9	10	10	8	47	10	50	3	9	.18
z	9	6	6	8	10	39	$8\frac{1}{2}$	$42\frac{1}{2}$	$3\frac{1}{2}$	$12\frac{1}{2}$	.29

Chi-squared = 4.34. For 10 d.f. this value would be exceeded in 90% random samples.

Appendix B.

Details of Tests used.

Copies are given here of the instructions issued to the judges of the variables "Likeability", "Smartness of Appearance", and "Ascendancy-Submission," also for "Expansion-Reclusion" which was not used as a determiner. A copy of Peel's Technical Selection Test is also included.

---

(1)

Likeability.

CONFIDENTIAL.

I would much appreciate your help in the following experiments:

(1) To arrange the following 12 boys in order, from the most to the least likeable personality, as they strike you.

(2) To do the same with the 12 girls.

Then to return me the cards, placed in your order of ranking, with the most likeable at the top.

NOTES.

1. By 'Personality' is meant the general impression the boy or girl has made on you.

2. The simplest way of choosing is to lay out the cards on the table, and consider each for (say) your choice to take on a holiday with you: OR to represent the school at a scout jamboree.

3. Please do not discuss your rankings with other staff, and be sure to include all the children in the ranking.

---

(2)

Smartness of Appearance.

I would much appreciate your help in the following experiments :

(1) to arrange the following 11 boys in order of Smartness of Appearance, from the most to the least smart, as they strike you.

(2) to do the same with the 11 girls.

Then to return me the cards, placed in your order of ranking, with the smartest at the top.

NOTES.

1. By Smartness is meant the general impression the boy or girl has made on you, in respect of cleanliness of person and habits, neatness of dress, and bearing. Do NOT consider mental qualities.
2. The simplest method is to watch the children for a day or two for these points, then to lay the cards on a table, and consider each in turn for this quality. Another way would be to look at them in class, and decide in what order you would pick them for a guard of honour.
3. Please do not discuss your rankings with other members of the staff, and be sure to include all the children in your rankings.

---

(3)

Ascendancy-Submission.

1. Please rank the 12 boys and 12 girls in respect of this trait, from highest to lowest. The following suggestions may help in assessing the children.

HIGH --- Strong influence among the others, good or bad, ringleader type.
--- The others look up to them.
--- Average: not a strong influence.
--- Sometimes led away by a stronger friend.
LOW --- Easily persuaded by a stronger will.

2. Disregard every other trait but the one being rated. Do not let yourself be influenced by a generally favourable or unfavourable estimate of the child.
3. Rank every child. Do not confer with others while ranking.

(4)

Expansion-Reclusion.

1. Please rank the 11 boys in respect of this quality, from highest to lowest. The attached 11 descriptions should be studied, and then the 11 children should be matched as far as possible to the descriptions.

2. Disregard every other trait but the one being rated. Do not let yourself be influenced by a generally favourable or unfavourable estimate of the child.

3. Rank every child. Do not confer with any other person while ranking.

4. Ranks will be held strictly confidential.

1. He is the most sociable and companionable lad in the whole group.
2. This boy is an exceptionally good mixer.
3. He appears very happy and easy in company.
4. He is a good mixer and enjoys companionship.
5. On most occasions, he is a normally sociable lad.
6. Usually quite sociable, he sometimes stays 'out of things'.
7. Though often lacking in sociability, he can on occasion be a pleasant companion.
8. He is a retiring lad, reticent, and not easy to draw out.
9. This lad is very silent and unsociable.
10. He is an exceptionally sullen and morose lad.
11. He is more unfriendly and solitary than any other in the group.

Appendix C.

The Statistical Treatment of the Factorial Group Estimate of Men Teachers on Girl Pupils.

In this case, only one factor was finally estimated. Initially the operation carried out in the other three cases was undertaken, i.e. the calculation

$$\hat{f}_o = M'_{LO} R_L^{-1} R_O \quad \text{(see page 69).}$$

It was found that the loadings of the first factor estimates much exceeded unity, while those of the second factor were small. The figures are given below.

I	-544	2.089	-1.336
II	054	-.246	.339

The calculations were repeated, with the same result. The following possible sources of error were considered:-

(a) Arithmetical Errors. A small initial error might have been magnified by the processes of pivotal condensation used in calculating the reggressions. Six-figure logarithms were then used to improve the accuracy of the calculations, but the result was unchanged.

(b) A Peculiarity of the Correlation Matrix. (see Table II). All the correlations between the

persons were high and positive, and the matrix tended to be hierarchical in form. (32, pp.5-10). The centroid factors obtained had indicated a high general loading. Although the matter was not investigated further, it appeared possible that an assumption of one general factor would lead to a better analysis of the data into its factors.

The single common factor was evaluated by means of Spearman's 'g' saturation method, as given by Thomson. (32, pp.153-160). The 'g' saturation is given by the formula

$$r_g^2 = \frac{A^2 - A'}{T - 2A}$$

where A = the sum of the relevant row in the correlation matrix (without diagonal entries).

T = the sum of all the rows in the matrix.

A' = the sum of the relevant row in a new matrix, where each coefficient is squared.

Applying this formula to the matrix in question, a large saturation by a general factor was found to be present.

801	756	810	911	777	841	961

This evaluation was used to estimate the regression of the group as a whole.

DO NOT OPEN THIS BOOK UNTIL YOU ARE TOLD TO DO SO.

(TECHNICAL SELECTION TEST).

T. S. 8

(TIME : 30 MINUTES)

E. A. PEEL

University of Durham.

Answer as many as possible of the exercises in this book.

You will not have time to do them all, and every so many minutes you will be told to stop and go on to the next page.

Be sure to stop whenever you are told.

You need not ask any questions because on each page you are told what to do.

Most of the exercises are easy; but a few are quite hard.

Waste no time; but keep on steadily until you are told to stop.

Score.	
X	
Y	
Z	
TOTAL ...	

ASK NO QUESTIONS.

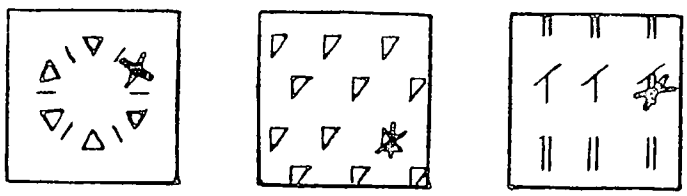
DO NOT OPEN THIS BOOK UNTIL YOU ARE TOLD TO DO SO.

X

(10 Minutes).

There is a fault in each of the following patterns. You are to find this fault and mark it with a cross X. Take care to place the cross **exactly** on the wrong part. If you wish to change your X put a ring round it like this (x) It will then not be counted.

Here are three patterns which have been done for you.



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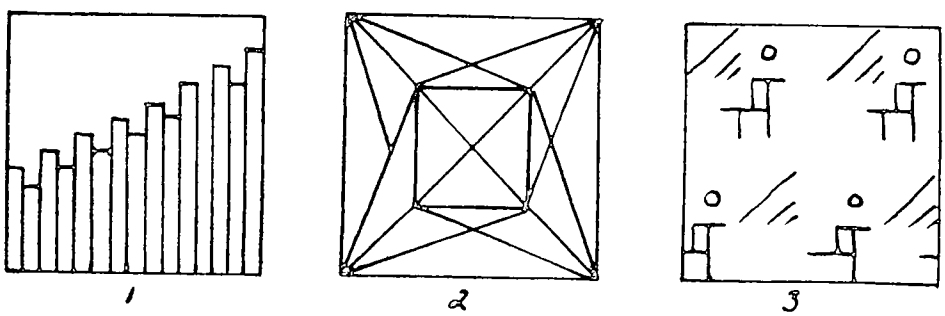

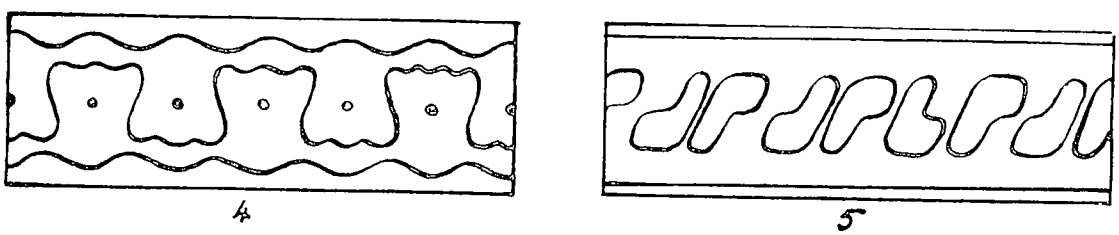

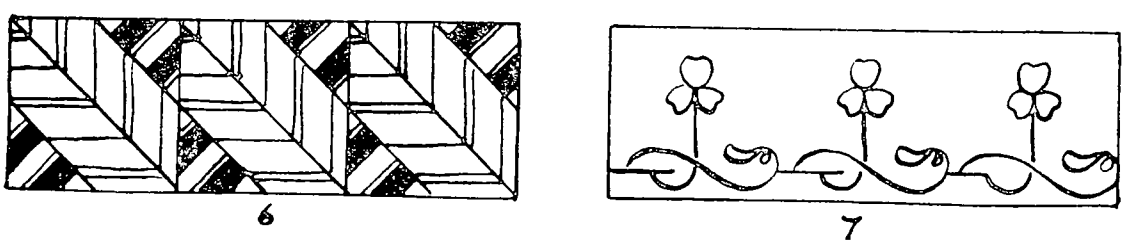

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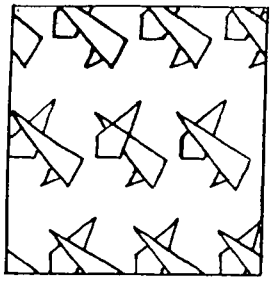

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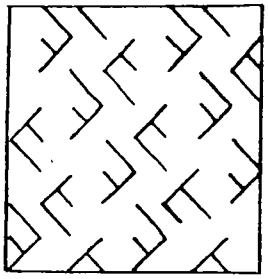

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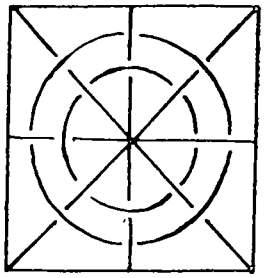

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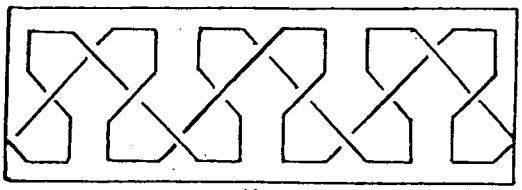
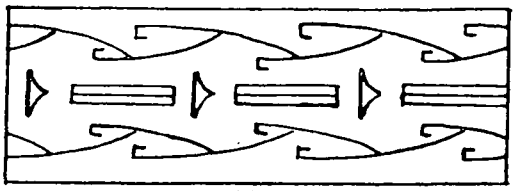


11



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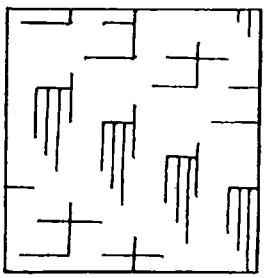

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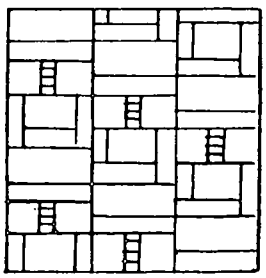

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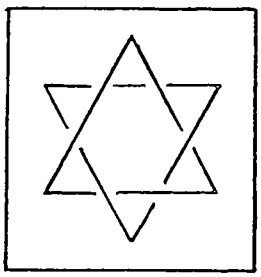

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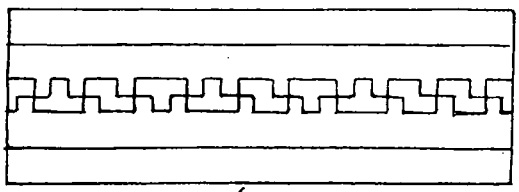

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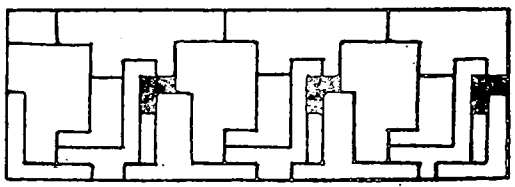

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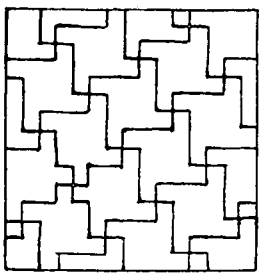

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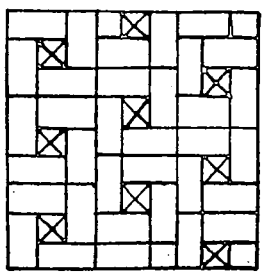


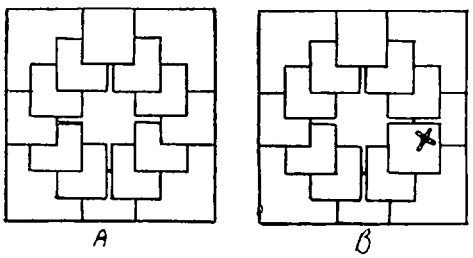
19

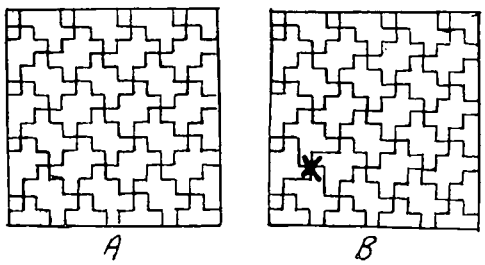
DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO.

(10 Minutes).

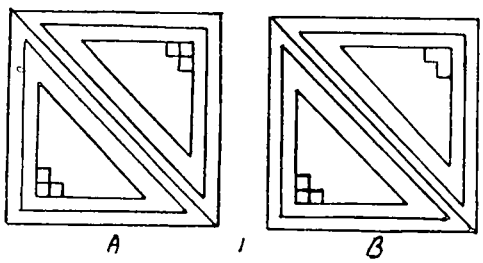
Below are pairs of patterns marked A and B. The second pattern B is different from the first pattern A. You are to find where B is different and mark the different part on B with a cross X. Do not mark A.

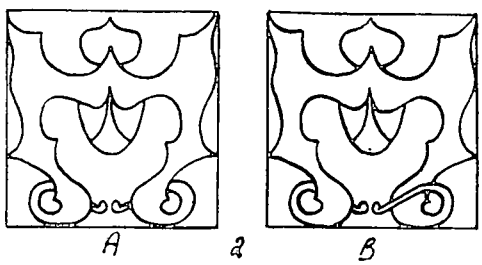
Here are two examples which have been done for you.

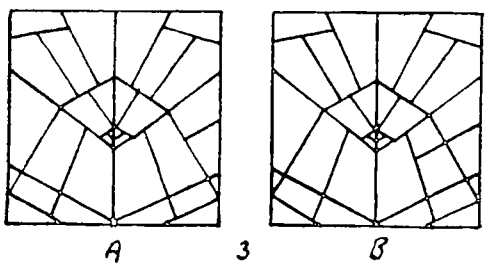


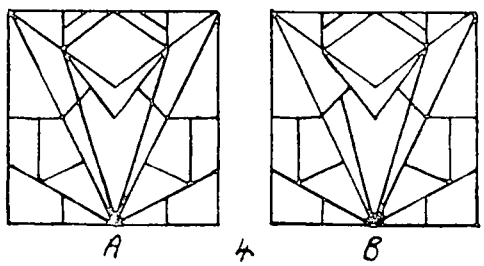


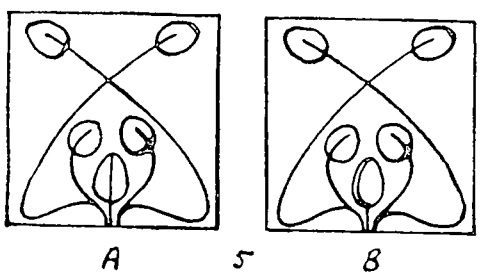
NOW DO THESE :-

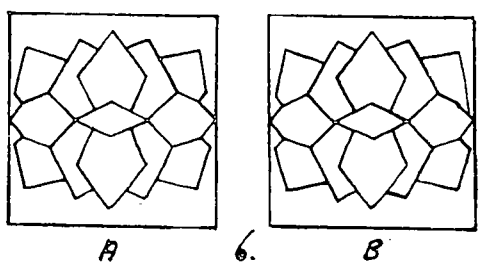












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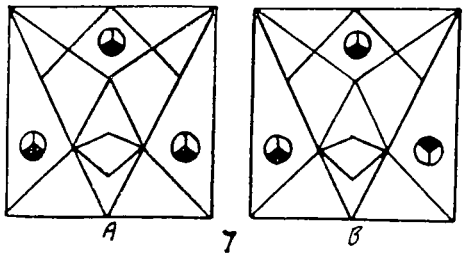
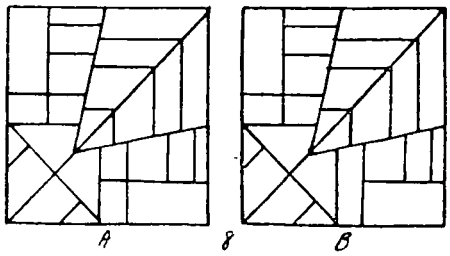
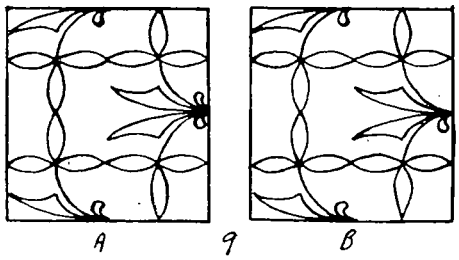
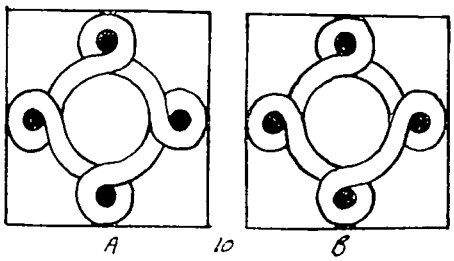
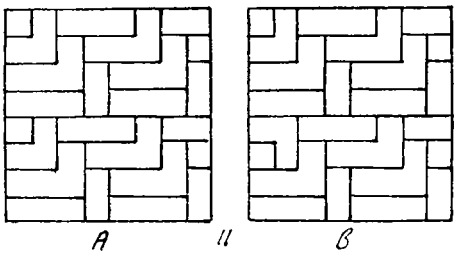
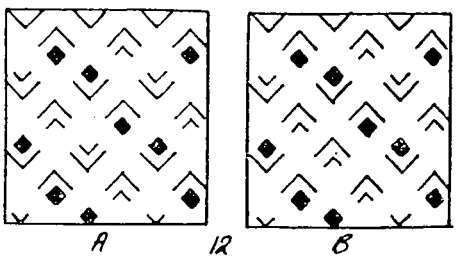


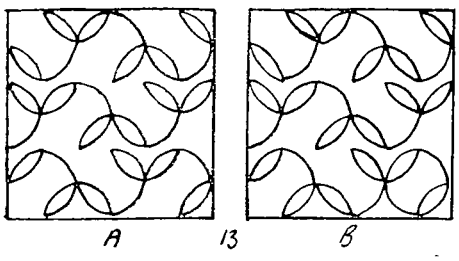


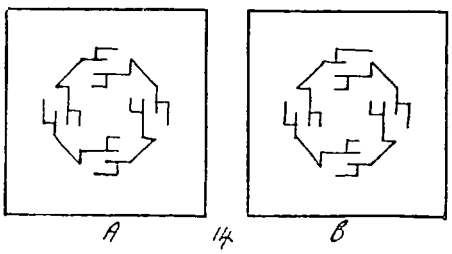


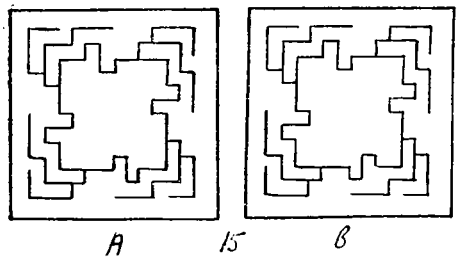


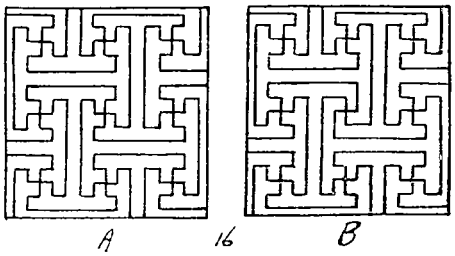










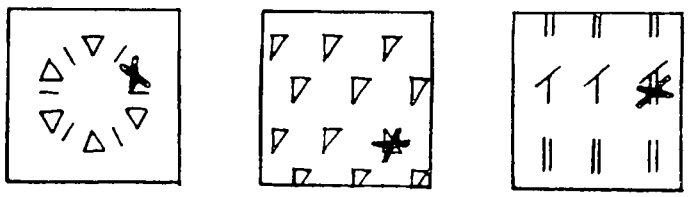


DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO.

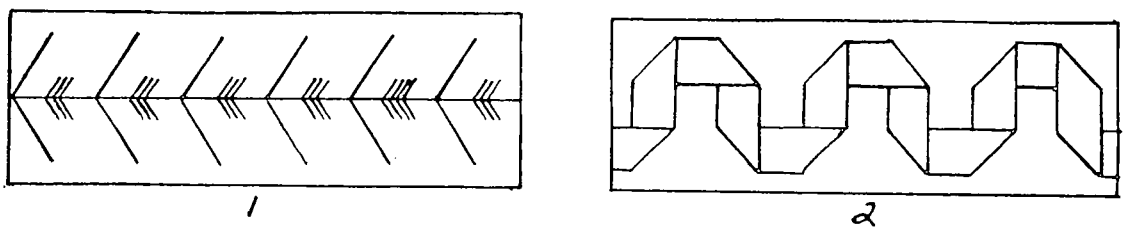
(10 Minutes).

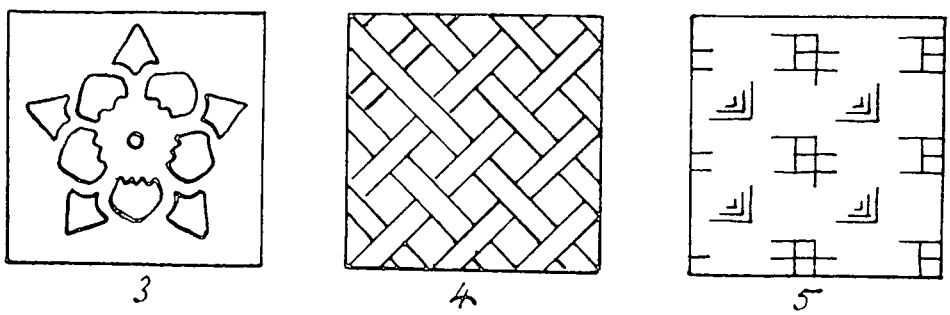
There is a fault in each of the following patterns. You are to find this fault and mark it with a cross X. Take care to place the cross **exactly** on the wrong part. If you wish to change your X put a ring round it like this (x) It will then not be counted.

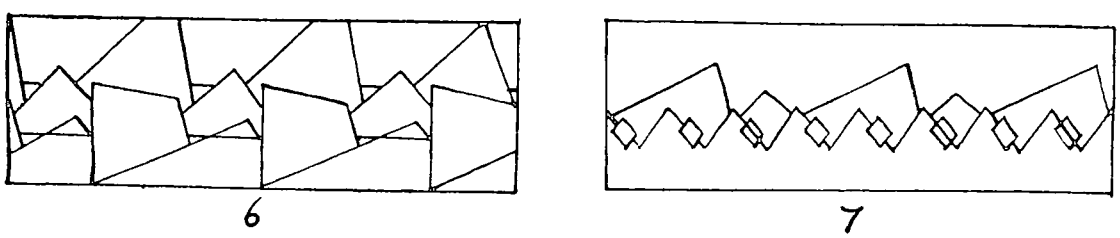
Here are three patterns which have been done for you.



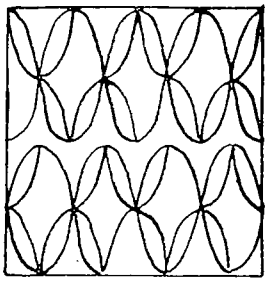
NOW DO THESE :-







GO STRAIGHT ON TO THE NEXT PAGE.



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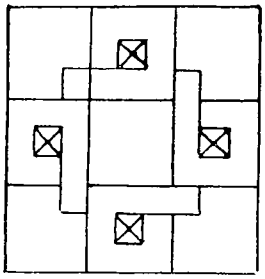

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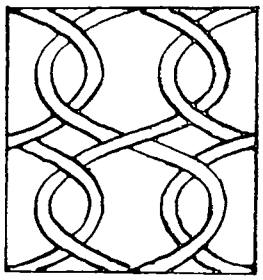

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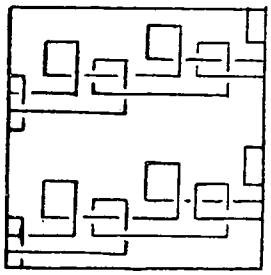

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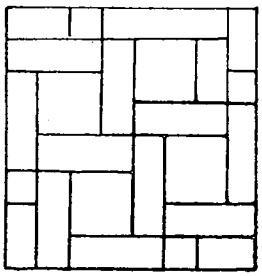

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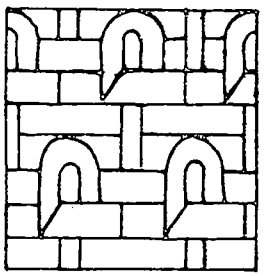

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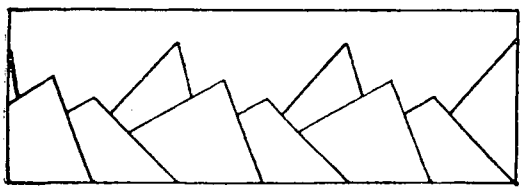

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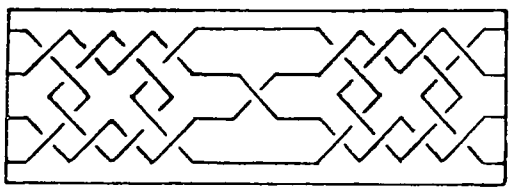

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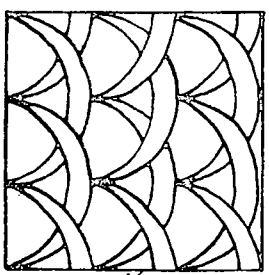

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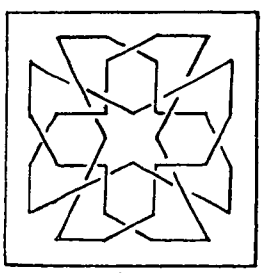

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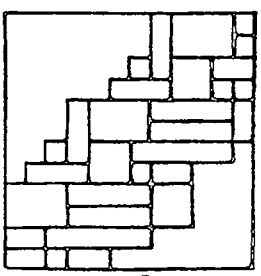

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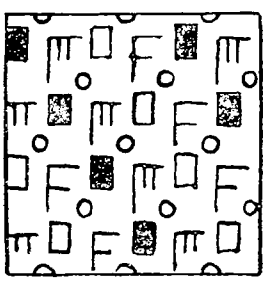
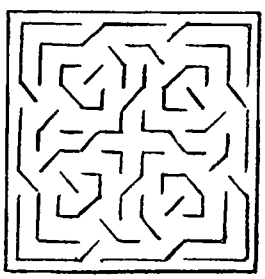


19



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Appendix D.

Calculation of weighting of Determiners by Multivariate Analysis.

The calculations referred to in Chapter VI Section V (pp.72-77), are given in this Appendix.

The weighting of the determiners is calculated by the formula

$$w^{o} = u^{o} R_{ab} R_{bb}^{-1}$$

Step 1. Pivotal condensation of the matrix $R_{ab} R_{bb}$:

1	064	282	-1.			345
064	1	609	.	-1.		673
282	609	1	.	.	-1	891
527	-609	-336				-418
246	709	518				1.473
255	136	509				900
546	209	246				1.000
127	082	-046				164
682	346	391				1.418
427	246	509				1.182
	996	591	064	-1.		651
	1	594	064	-1.004		655
	591	921	282		-1	794
	-643	-485	527			-600
	694	449	246			1.388
	120	437	256			812
	174	092	546			812
	073	-084	127			117
	302	199	682			1.183
	218	389	427			1.034
		570	244	594	-1	407
		1	428	1.042	-1.756	714
		-104	568	-645		-180
		037	201	696		935
		366	247	121		734
		-012	534	175		698
		-127	123	073		069
		020	663	303		985
		259	413	219		892

....Over/

613	-537	-182
185	657	066
090	-261	643
539	187	-021
177	206	-224
654	283	034
302	-051	455
2.561	484	772
w_i	w_{ii}	w_{iii}

(summing the columns: u' is given the ratio 1:1:1:1:1:1:1)

Step 2. Calculation of r, the best correlation.

By Peel's formula

$$r = \frac{w' \, Rba \, u}{u' \, R_{aa} \, u}$$

The top term is calculated by the process

$$\begin{bmatrix} 2.561 \\ 484 \\ 772 \end{bmatrix} \begin{bmatrix} 527 & 246 & 256 & 546 & 127 & 682 & 427 \\ -609 & 709 & 136 & 209 & 082 & 346 & 246 \\ -336 & 518 & 509 & 246 & -046 & 391 & 509 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} .795 & 1.372 & 1.111 & 1.688 & .331 & 2.215 & 1.606 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 9.117 \end{bmatrix}$$

The lower term is found by the calculation

$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} -427 & -064 & 136 & -055 & 264 & 15 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

(etc: R_{aa} on page 74: 7 x 7 matrix).

$$= \begin{bmatrix} 1.009 & 2.764 & 3.927 & 4.700 & 3.409 & 4.391 & 4.127 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 24.328 \end{bmatrix}$$

Thus $r = .612$

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