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AN INVESTIGATION OF THE QUALITY OF TEACHING

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A Thesis in Education presented for the

Degree of Master of Arts

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1.

THE RELATION OF TEMPERAMENT TO INTELLIGENCE
AND SCHOLASTIC ABILITY.

What is temperament? And what is its relation, if any, to intelligence and school progress? These questions open up a very wide problem - a problem which has been attacked by surprisingly few psychologists. Some make no reference to it at all, others speak vaguely about it, while a few have made some serious attempt to clarify the position.

For this reason, before embarking upon a practical investigation of the problem, it was deemed advisable to make a fairly extensive survey of the literature available. The present work is thus in two parts: Part 1. containing the attempt to set out the present psychological position of temperament, and Part 2 dealing with the investigation proper.

PART 1.TEMPERAMENT.Introduction:

For over two thousand years (to our knowledge) writers on the subject of human behaviour have dealt with temperament. Until recently the interpretations made by the old Greek and Roman physicians and philosophers have continued to be accepted.

Modern advances in science have shown, however, the inadequacy of these ancient beliefs, though until about the 18th century little attempt was made either to justify or to replace the old doctrine of the humours. The 18th and 19th centuries show attempts to break away from this age-old hypothesis but it was found most difficult to discover any readily acceptable alternative. It is really only in the present century that we begin to find interpretations of scientific value. Here, again, the problem becomes more difficult on account of the lack of uniformity in psychological terminology: though the difficulties encountered from the very nature of the subject itself are alone sufficient to account for divergences either of treatment or of findings.

(1) "The Psychology of Character", P.8.

(2) "Character and Conduct of Life", P.41.

SECTION 1.

HISTORICAL.Early Influences:

In examining the position of temperament through the centuries one cannot help but note the lack of advancement made during the period extending from the time of the early Greek Empire till quite recent years. Hypotheses put forward two thousand years ago have continued to hold sway, almost without question. Of this, Dr. Roback writes:

"The semi-scientific path, which after considerable meandering, opened up into the highway of modern endocrinology, was as is well known, cleared by Hippocrates, whose theory of the humours as the basis of our temperaments, has, except for the modification of the Graeco-Roman physician Galen, a few centuries later, withstood the onslaught of time perhaps more successfully than any other ancient doctrine."(1)

and McDougall:

"The theory (of temperament) is as old as science, for it comes down to us from the ancient Greeks; but it is only in very recent years that vague speculation on the problem has begun to give way to knowledge." (2)

It was early in the fourth century B.C. that the Greek physician Hippocrates set out his beliefs with regard to the human body. (Some accounts mention Empedocles, who preceded Hippocrates by some few years, as the first to set forth the position for the benefit of posterity.) Man was regarded as composed of the four elements - earthy (firm)

(1) "The Psychology of Character", P.8.

(2) "Character and Conduct of Life", P.41.

watery (fluid), airy (gaseous), and fiery (flame natured.) Ill health was due to a wrong proportion of these elements. The seat of hot and dry fire was the "yellow gall"; of cold and wet water, the "phlegm"; of moist and warm air, the blood; of cold and dry earth, the "black gall".

Even in those early days, however, Aristotle gave this theory a rather more scientific turn when he sought to account for fundamental individual differences by ingredients of the blood - the blood being the basis of all temperamental differences instead of being merely one of the humours. For example, the tendency of the blood to clot was due to the earthy element in it and resulted in the fiery or choleric temperament.

In the second century A.D. lived Claudius Galenus, or Galen, next to Hippocrates the most celebrated of ancient physicians, and he further elaborated the writings of his predecessor. It is to these two writers mainly, that the world is indebted for the statement of the theory of the humours as an explanation of temperament.

It was Galen who gave the more final form to the classification of temperaments. The qualities on which his classification was based, were four in number: warm, cold, humid, dry. These in combination gave the types: sanguine, phlegmatic, melancholic, choleric, though he recognised also the "normal", and four other types each of which had one of the four qualities greatly predominating.

It is interesting to note that the word temperament

derives from the Latin "temperare" - "to regulate."

Later Developments.

We have to come as far as the eighteenth century before we find any inclination to reconsider the position. Even then, it was not altogether that the old classification was thought to be wrong - rather was it considered, by the few writers who were interested, inadequate.

In the mid-eighteenth century Haller gave the theory of humours its first real set-back. He contended that the temperaments were not necessarily bound up solely with the blood stream: the firm parts through which the blood flowed were more fundamental in accounting for temperamental differences.

Research in the field of nerve physiology led to a further change of doctrine. The nervous system was now to be the seat of the mysterious compositions hitherto ascribed to the humours alone.

In the following years of the eighteenth and nineteenth centuries, alchemy, physics, chemistry, pathology, physiology, neurology, and phrenology all played a part in influencing theories of temperament. The term "temperament", in fact, came to signify little less than "constitution." Kant, for instance, regarded "tension" and "relaxation" as the two main conditions on which to base any theory of temperament.

In France, Richerand was also getting away from the basic idea of "humours," and stressed instead the more general effect of the various organs of the body not only

on the physical but also on the moral and intellectual sides.

In the following century, the German-Jewish anatomist, Jacob Henle, based his theory on the "tonus" of the nervous system, the speed of its reaction, and its duration: the approach was a quantitative one.

Philosophers and psychologists became sufficiently interested again by the middle of the nineteenth century to renew their efforts in the temperament field.

Bahnsen instituted the first large scale enquiry.

Pilo sought fundamental differences in the chemical composition of the blood, and in its thermicity.

Wundt followed Kant closely. He also, rather naively, suggested the desirability of all four temperaments being made use of by the same person at different times, as required, to meet varying circumstances!

Seeland, a Russian, expounds a striking physical theory of molecular vibration in the nervous system, causing temperamental make-up.

Of the most recent investigators we can mention here Meumann, who regards character as a disposition of the will; Apfelbach, who finds the key in the mode of drainage of the individual's psychic energy; and finally Cannon and Berman who stress the importance of the ductless glands.

Despite various attempts at original theories as explanations of temperament, however, we still find considerable adherence in one form or another to the old Graeco-

Roman formula. Until the present century little progress towards any more precise statement of the position is to be noted; and as far as nomenclature at last is concerned modern writers still find considerable use for the old form -

"If the doctrine of the humours has now been abandoned, its atmosphere still lingers, as is evident from the very persistence of such expressions as "good humour", "ill humour", "humorous", "humoresque," etc. " (1)

Ludwig Klages has written refreshingly on the subject:

"We need only to mention names like those of Kant and Wundt in order to demonstrate by examples of varying modernity that the learning of professors of the theory of cognition and of psychophysics is no safeguard against an uncritical acceptance of archaic articles of faith." (2)

"In course of time innumerable analogies crystallized round the four-fold division (of Galen)." (3)

Dr. E. Webb writing in "Character and Intelligence" is quoted by Constance Bloor:

"Among abstract propositions put forward by theologians, teachers, and psychologists, many writers have issued classifications of the temperaments. They are remarkable for the frequency with which they reach the ancient and time-honoured four-fold classification.....But the apparent unanimity is merely superficial. While adopting the terms to signify four types they vary as widely as possible in the meaning they attach to them and in the explanations offered." (4)

"The progress of the sciences of physiology and medicine led inevitably to the abandonment of the doctrine of the humours of the blood."

- (1) Roback op.cit., P.41.
- (2) "The Science of Character", P.144.
- (3) Klages, op.cit., P.147.
- (4) "Temperament", pp. 23-24.

"We can find traces of the attempts to connect the temperaments with the action of the nerves and of the muscles but the most modern counterpart of the doctrine of humours is undoubtedly to be found in the theory of the endocrine glands." (1)

We cannot but note with admiration, however, in the light of their inadequate scientific knowledge, the intelligent interpretation made by the originators of the humoral doctrine.

"It is one of these curios of cultural destiny that after so many migrations and transformations the doctrine of humours should, like a colossal ballad or rondo extending over twenty-five centuries, hark back to the beginning when all explanations centred around the fluids of the body. The original theory, now concluding its cycle in the almost universally received opinion of to-day that the secretions of the endocrinal glands injecting into the blood hormones of various sorts are of vital importance in the organisation of a given temperament, provides at present much food for thought.....What if the old terms are no longer used in discussions of the effects of the ductless secretions the "manes" of Hippocrates and Galen can still point with triumph to their speculative child and say their "I told you so". On the other hand let us now underestimate the progress of science." (2)

(1) Bloor op. cit., P.33.

(2) Roback, op. cit., PP.101-2.

(1) Bernard L.L., "Social Psychology", P. 254.

(2) "Democracy and Education", P. 370.

(3) "Psychology; Its Facts & Principles", P. 488.

SECTION 2.

DEFINITIONS.

For the purposes of this investigation it is not necessary to adopt any one precise definition of the term temperament. The survey is being made on general lines and with a liberal interpretation of the various authors' uses of the term. Some have been found to use such terms as disposition, temperament, character and personality almost interchangeably. Though to a degree Bernard may be right when he remarks that "it is doubtful if any definite distinctions can be drawn between temperament and disposition and character", (1) in general it can be said that the term personality is used with the implication of an integrated totality of all parts and functions - an organic whole. The use of the word character is much more elastic, some making it refer to all traits of human difference; others again to personality minus intelligence; to peculiarities or distinctive traits generally; to an aspect of personality implying self-control or autonomy; to general moral tone. It would seem advisable to limit its use to the higher forms of volitional behaviour which would bring in, as J. Dewey (2), and H.L. Hollingworth (3) suggest, the idea of social status and consequences.

(1) Bernard L.L., "Social Psychology", P. 254.

(2) "Democracy and Education", P. 370.

(3) "Psychology; Its Facts & Principles", P. 485.

Disposition and temperament are difficult to distinguish. McDougall defines a man's disposition as "the sum total of his instinctive tendencies"(1). As useful a distinction as any is suggested by Bernard, that temperament be regarded as disposition in action.

With regard to temperament the definitions and references that follow indicate considerable lack of uniformity. One noticeable feature is the tentativeness with which many of the writers submit their definitions, making it appear that any simple, all-inclusive yet definite statement about temperament is as yet almost impossible of attainment. This lack of specificity is responsible, in part, for the frequent conflicts of opinion among psychologists and others concerned.

It is lack of appreciation of the wideness of the temperamental field that has lured some writers into oversimplified accounts of temperament, though McDougall, for one, has realised this danger when he says that as well as the influences of the great bodily organs,

"there are other factors also and it is impossible to bring them all under one brief formula; and since temperament is the resultant of these many relatively independent factors it is impossible to distinguish any clearly defined classes of temperaments, as the ancients, as well as many modern authors, have attempted to do. Some of the best modern psychologists have been led into absurdities by attempting this impossible task." (2)

- (1) "The Energies of Men," P.171.
- (2) "Social Psychology," P.100.

F. Kretschmer, too, writes in similar vein:

"The expression temperament has for us no well defined meaning, but it is a heuristic notion the breadth of whose field of reference we have not yet determined, but which should be a landmark for an important fundamental differentiation in biological psychology." (1)

H.L. Hollingworth puts the general position very clearly when he says:

"The most that scientific psychology can now offer on this topic is the suggestion that traits of temperament as well as of character are complex resultants. They are resultants on the one hand of native predispositions and acquired habits of action, feeling, thought and speech. They are resultants also in the sense that they are not identifiable psychological processes. In them are involved all the individual variations, such as in learning, imagination, motivation, feeling, decision, attention. Many of the features both of character and of temperament depend also on peculiarities of intelligence." (2)

Also referring to the difficulties of the problem is

J.A. Hadfield:

"In the analysis of character traits in individuals we find hereditary factors play a less important part in producing specific character traits like jealousy, depression, thoughtful-ness, kindness or tranquillity than was originally thought. So little is known about temperament that it is at present impossible to dogmatise: and while psychologists treating the psychoneuroses are convinced that temperamental factors undoubtedly play an important part in the determination of character and in the production of psychoneuroses, it is difficult to determine how great a proportion is due to these hereditary and physiological factors, and how much to environment." (3)

(1) "Physique and Character", P.252.

(2) op.cit., P. 485.

(3) "Psychology and Modern Problems," P.7.

And R.B. Cattell:

"At the present time the study of temperament is one of the most unsatisfactory, as far as real progress is concerned, in the whole field of psychology. This state of affairs is partly due to the difficulty in approaching an aspect of mind originally arbitrarily defined as that part of mental life determined by physiological, particularly metabolic factors....also to the unconscionable excess of speculative over experimental treatment." (1)

Though many writers fail to define temperament at all, some few authoritative opinions have been found, some being in the form of an explanation rather than of a definition.

(1) "Temperament is the name of one of those general background conditions or relatively permanent sets of attitudes which influence behaviour: or perhaps we should say, it is the characteristic form or direction which behaviour takes under certain organic and neuro-psychic conditions." (2)

The same writer, after considering several definitions by other writers, points out that most of the definitions express the view that temperament is behaviour rather than structure, but that all trace this behaviour back to organic structure.

(2) "A man's temperament is the sum of the effects upon his mental life of the metabolic or chemical changes that are constantly going on in all the tissues of his body." (3)

(1) "British Journal of Psychology," Vol. 23.

(2) Bernard op.cit. P.251.

(3) McDougall, "An Outline of Psychology". P. 354.

While temper is differentiated slightly as "the expression of the way in which the conative impulses work within man." (1)

(3) "Predisposition toward emotional reactivity and inclination toward special feelings and moods, are, indeed, what we usually mean by temperament." (2)

(4) "By temperament I understand the sum-total or blend of one's affective qualities as they impress others." (3)

(5) "Temperament is a native constitution of the mind which determines the type and intensity of the various emotional states." (4)

and "It may be that temperament is nothing more or less than a name for the quality and intensity of an instinct in relation to other instincts and innate tendencies." (5)

(6) "Temperament signifies total affective make-up." (6)

(7) "The word 'temperament' is used to refer to an innate, relatively permanent disposition." (7).

Adler emphasizes the dependence of temperament upon instinct, while Aveling (8) is prepared to accept McDougall's definition above.

- (1) McDougall op. cit. P.353.
- (2) Hollingworth, op. cit. P. 485
- (3) Roback, op. cit. p.155.
- (4) Thomson M.K., "The Springs of Human Action", p.108.
- (5) *ibid.* p. 110.
- (6) Bridges, J.W. "Psychological Review", 1923.
- (7) Downey J., "The Will-Temperament and Its Testing," p.60.
- (8) "Personality and Will," p. 152.

Comments on Definitions.

These definitions illustrate the variety of methods of approach. On analysis some of the apparent differences do become reconciled, though there remains evidence of the considerably broader conception of temperament held by some authors than by others. The essential point of agreement is found in the use of such terms as instinct, emotion, innate, relatively permanent.

For the purposes of this work, however, it is unnecessary to pursue further the matter of definition.

divided by the ancient philosophers. The extent to which this has been accepted by later generations has been most remarkable. Though many writers have suggested modifications or additions, lack of any other more suitable basis for classification has resulted in continued adherence to the original. And though in the present century it has been shown that this formula is quite unsound, on account of the useful general description of this aspect of character provided by the "celebrated quartet of temperaments", many modern writers have been satisfied to leave these type names untouched and to accept them as serving the purpose of a descriptive classification.

"The doctrine of temperaments which we owe to Galen classified the observable differences of disposition under four heads.... It is needless to say that this classification, so far as the physical bases are concerned, is scientifically valueless. At the same

SECTION 3.

CLASSIFICATIONS OF TEMPERAMENT.

It is intended to survey rapidly some of the classifications of temperaments which have been made from time to time. These have been made more extensively than have the attempts at explaining the causal bases of the differences in behaviour between man and man.

Reference has already been made to the four-fold division bequeathed by the ancient philosophers. The extent to which this has been accepted by later generations has been most remarkable. Though many writers have suggested modifications or additions, lack of any other more suitable basis for classification has resulted in continued adherence to the original. And though in the present century it has been shown that this formula is quite unsound, on account of the useful general description of this aspect of character provided by the "celebrated quartet of temperaments", many modern writers have been satisfied to leave these type names untouched and to accept them as serving the purpose of a descriptive classification.

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- (1) Galley, J., "The Human Mind", Vol. 1, p. 53.
- (2) Bloor, op. cit., p. 24.

"time it served to mark off some well-recognised differences of disposition; and recent writers on the subject have made Galen's classification their starting point, and endeavoured to account for the manifold differences of disposition by variously combining the four features here distinguished." (1)

"The fact that it has proved possible to harness this ancient classification in support of so many different investigations of psychological types must in itself indicate the vagueness of the mental characteristics which were attached to a comparatively well defined physical basis." (2)

The various classifications that follow are given not with the belief that they are exhaustive but rather to illustrate their variety and, to a certain extent, the trend of current thought. It is not intended to discuss each individually, except perhaps with occasional brief comments, but for the purpose of this work as a whole the writer was anxious to discover whether there was any general agreement as to a basic classification from which it would be possible to proceed with the experimental side of the investigation.

To go back as far as the eighteenth century we find that Richerand, though not accepting the classical idea of the humours was satisfied to use the old terms. He listed five temperaments, each of which was distinguished by both physical and mental-moral characteristics: sanguine, bilious, melancholic, phlegmatic, nervous. His "bilious" temperament is similar to the older "choleric", while the new term "nervous" is characterised by a "small frame and muscles,

(1) Sully, J., "The Human Mind", Vol. 1, p.58.

(2) Bloor, op. cit., p.24.

with vivacious, inconstant, great nervous susceptibility."

In the same century, Kant divided the four old temperaments into those of feeling (sanguine and melancholy), and those of action (choleric and phlegmatic,) while he held that each temperament was subject to two main conditions of tension and relaxation.

Perez (in France, 19th century) "discloses a behaviouristic streak for the basic principle with him is movement or action. As a movement may be quick, slow or vehement, we get six different classes of character." (1)

Bahnsen evolved, besides the four old types (though with "melancholic" displaced by "anaematous"), three subordinate species for each, giving altogether a total of sixteen temperaments.

A similar arrangement to that of Richerand's was made, in 1892, by Dr. A. Stewart who, in fact, was anxious to revise the old classical doctrine. He labels the phlegmatic as lymphatic and omits melancholic, leaving sanguine, bilious, lymphatic, and nervous.

Wundt, too, uses the classical names and presupposes the contrasting pairs of quick and slow; strong and weak.

The descriptive trend is well exemplified by Charles Mercier who describes "the artistic temperament, the very different "temperament of the artist", the clever man, the capable, the envious, jealous, suspicious, religious temperaments, the faddist, the philosopher, the man of

(1) Roback, op.cit., p.198.

"business, the practical man and the man of action." (1)

Meumann sets out a table of "affective dispositions", or temperaments, based largely on excitability, persistence, active or passive character of feelings; coupled with either pleasure or displeasure.

Observation of the modes of mental and social adjustment leads Rosanoff to describe several chief "types of personality:" in addition to the normal, there are the "antisocial" - underlying hysterical manifestations; the "cyclothymic" - very unstable, of four types: manic, depressive, irascible, emotionally unstable; the "autistic", shut-in personality - vague, dreamy, shy, detached person; and the "epileptic" - violent, headstrong. These types are quantitative variations of normal forms.

William James, identifies two main contrasting types. In his "Pragmatism" he writes:

"The history of philosophy is, to a great extent, that of a certain clash of human temperaments."

These types are finally resolved under two headings:

"I will write these traits down in two columns. I think you will practically recognise the two types of mental make-up that I mean if I head the columns by the titles "tender-minded" and "tough-minded" respectively." (2)

The contrasting pairs thus obtained are: rationalistic and empiricist; intellectualistic and sensationalistic; idealistic and materialistic; optimistic and pessimistic; religious and irreligious; free-willist and fatalistic; monistic and pluralistic; dogmatical and sceptical.

(1) Quoted by Hollingworth, op. cit. p.486.
(2) "Pragmatism", pp. 11-12.

C.G. Jung was responsible for the now well-known dichotomy of introverts and extraverts.

In his "Psychological Types," Jung refers to a fellow German, Wilhelm Ostwald, thus:

"Ostwald compares his two types with the four ancient temperaments with special reference to the peculiarity of slow or rapid reactions, which in his view, seems to be fundamental. The slow reaction corresponds with the phlegmatic and the melancholic types, the quick reaction with the sanguine and the choleric. He regards the sanguine and the phlegmatic as the normal middle types. (1).

and,

"As one reads the Ostwald biographies one sees at once that the romantic type corresponds with the extravert, the classic with the introvert." (2)

Spranger holds that the direction of one's life is the key to personality. Thus he gets the types: economic, social, man of power (political), theoretician, artist, religious.

F. Allport (3) has exhaustively analysed the traits of personality. As well as headings of Intelligence, Motivity, Self-Expression, Sociality, he has that of Temperament under which he lists: Emotional frequency and change; emotional breadth; emotional strength; characteristic mood; emotional attitude. Commenting on this Bernard remarks:

"It will be observed that he makes temperament more exclusively emotional than is customary with most writers.

(1) p. 403.

(2) *ibid.* p. 404.

(3) "Social Psychology", pp. 104-5.

"This usage has at least one advantage in its favour. It sets temperament off more definitely from the general and inclusive fact of personality." (1)

Another modern writer, this time a psychiatrist, who has written extensively on our subject has been F. Kretschmer. He bases temperament on the working of the cerebro-glandular apparatus. In "Physique and Character," he makes a lengthy classification of various physical types - his method, as well as his thoroughness, is shown by the fact that under each of these headings - Face and Skull, Physique, Surface of the Body, Glands and Intestines, Measurement, Temporal - he has some dozens of sub-headings. From extensive observations along these lines he has been able to draw up a comprehensive list of types, which, broadly, may be resolved into two main classes:

(1) The psychological type - divided into "cyclothymes" (easily adjusted), and "schizothymes" (more difficult adjustment to reality), with other finer divisions between. Quoting the author(2) "Cycloid men are sleek and uncomplicated beings whose feelings rise directly, naturally, and undisguised to the surface..." Schizoid men have "a surface or depth", but it is in this case more difficult to judge from appearances.

(1) Bernard, op. cit., p. 257.

(2) Kretschmer, op. cit., p. 146.

(2) The physiological: physical differences range between the "pyknic" (thickset, stumpy), and the "asthenic" (tall and lean). Relations with the psychological types are established also.

William McDougall refrains from attempting a classification of temperaments, though he appears to approve in general of Jung's types of introvert and extravert. (1) (It is interesting to note, too, that several other writers approve of Jung's two-fold division, though not necessarily with his precise meanings. In this position, for example, are C.G. Seligman (2) R.S. Woodworth, James, and, to a degree, Kretschmer. Others again, consider that a two-fold classification is too broad to have any scientific value.) However, he differentiates the term "temper" from that of temperament, defining it as "the expression of the way in which the conative impulses work within man." (3) which definition many writers would be satisfied to use for temperament itself.

He finds a range of native varieties of temper, and "it seems clear that these peculiarities of temper which in the main are native endowments are very important as determinants of character." (4)

The impulses referred to in his definition above differ in respect of (1) their strength or intensity, (2) their persistency, (3) their susceptibility to the influences of

(1) McDougall "An Outline of Psychology", p. 357.

(2) "Psychology and Modern Problems", p. 89.

(3) McDougall, op. cit. 353.

(4) McDougall, "Social Psychology", p. 381.

of pleasure and of pain. Hence:

"We can, I think, explain all the varieties of temper as being conjunctions of different degrees of these three attributes. These will be eight well-marked types corresponding to the eight possible combinations: (1) steadfast and confident. (2) fickle and shallow. (3) violent and unstable. (4) despondent. (5) anxious. (6) hopeful. (7) placid. (8) sluggish." (1).

June Downey whose attempt to provide an objective basis for the measurement of temperament is one of the few of its kind, finds in her book, "The Will-Temperament and Its Testing", that all the traits of the will-temperament can be broadly grouped under three headings -

- (1) speed and fluidity of reaction
- (2) forcefulness and decisiveness
- (3) carefulness and persistence.

L.L. Bernard contributes a very pertinent paragraph in his "Social Psychology", which illustrates the present position so well that it is here quoted:

"Classification of Temperaments. There have been many attempts to classify the temperaments though there is no more agreement here than in the matter of definition. The classification most generally mentioned comes down from an early unscientific physiology and psychology and includes the terms sanguine, choleric, phlegmatic, and melancholy, to which we often add nervous. In addition to these characteristic terms indicating corresponding behaviour of the individual, the present author has collected the following terms indicating types of behaviour or temperament: feminine, masculine, cheerful, happy, sweet, morbid, gloomy, sour, secretive, dainty, precise, lazy, slow, indifferent, dull, stupid, calm, average, restless, ambitious, active, quick, alert, brilliant, emotional, sympathetic, frank. Obviously some of these terms overlap, just as temperamental types overlap, and some may object that in certain cases they indicate disposition or character rather than temperament." (2).

- (1) McDougall, "Social Psychology" pp.382-3.
- (2) Bernard, op. cit. 254.

A classification on a rather different basis from others that we have noted is provided by Louis Berman in "The Glands Regulating Personality." Further reference to his glandular theory will be made in a later section so it will suffice here to state that his types depend upon the functioning of the glands of internal secretion. Thus he gets "adrenal centered" (vital, aggressive, pugnacious), "thyroid centered" (restless, excitable, nervous), "thymus centered" (often brilliant but unstable), "pituitary centered", "gonad centered", and their combinations. Each of these types provides different personal characteristics according to the varying effects of the secretions in the blood stream.

Complexity of the Position.

From these references to the various classifications of temperament it can be seen that there is considerable diversity of opinion, due, in part, to the lack of agreement as to the fundamentals of the situation. Before searching for common elements in these miscellaneous classifications there are some apt references which illustrate at once the difficulties and even express the doubt as to whether any classification at all is possible.

"Classifying the characters and temperaments of men is like classifying their occupations. Many classifications are equally feasible and none of them reflects the intrinsic psychological factors involved. Such classifications again apply only to the various extremes of human nature and leave the great mass of mankind without character and with no temperament, since they do not represent extremes. (1)

(1) Hollingworth, op. cit., p. 485.

"This is a very difficult subject which most psychologists are glad to leave alone." (1).

"An unbiased look at life suffices to show us that for many persons we would remain at a loss about the temperament to be selected, while for not a few we should have to make combinations and posit, for example, a melancholy-sanguine type or a choleric-phlegmatic type". (2).

"The so called four temperaments could not be upheld even if they could be defined in the exactest manner.....for in them there is a conflict of wholly diverse principles of classification." (3)

One fact that appears to have made classifications more difficult has been the reluctance to give-up the ancient four-fold division. This has tended to restrict the initiative of investigators and in some cases where this has not followed, there has been instead an unfortunate adoption of the old phraseology, though with varying connotations.

The very division into four is in itself illuminating. This apparently has been due to two main causes: (1) The fact that two pairs of opposites give four possible combinations - thus warm and cold; moist and dry produce moist-warm, moist-cold, dry-warm, dry-cold. Such a classification is at once straight-forward and productive of apparently satisfactory results.

(2) Our natural conservatism together with the mystic nature and consequent influence of the number four, which is well brought out by Klages:

(1) McDougall, "Social Psychology", p.99.

(2) Klages, op.cit. p.144

(3) ibid. p.147.

"There is hardly a more instructive example of the tough vitality of a custom whose meaning and origin have been forgotten, and particularly of the almost daemonic vitality of a number than this four-fold classification of temperaments. We may indeed preface our further account with what every psychologist might suspect even without historical data, namely, that the attempts, spread over twenty-five centuries, to divide into four regions, first the human body and then the soul were inspired by the sacred nature of that number." (1).

Though nominally no more than extensions or modifications of the older forms there emerged at different times varying factors seeking appropriate pigeon-holes. "The colour of hair, pigmentation, facial types, bodily habit, circulation of the blood, digestion, disposition for disease, were all classified by temperaments, and the most diverse urges and other traits of character were connected with them. It will be seen that the name and number four have remained but that the meaning of the thing has changed very considerably in the course of time." (2) The Endocrine Glands.

Though only a comparatively small amount of literature is as yet available on the subject, important advances have been made during the past thirty years in the study of hitherto obscure body organs. One of the foremost investigators has been W.B. Cannon. He finds that a "group of remarkable alterations in the bodily economy have been discovered" (3) to occur in conjunction with pain, hunger

(1) Klages op.cit.p.144

(2) *ibid.* p.147.

(3) "Bodily Changes in Pain, Hunger, Fear and Rage", p.Vll.

and the major emotions. These changes, he says, are directed towards efficiency in physical struggle. "More and more it is appearing that in men and in most of the higher animals the springs of action are to be found in the influence of certain emotions which express themselves in characteristic instinctive acts." (1)

In addition to the more readily observable and mainly superficial disturbances, "there are other organs hidden deep in the body, which do not reveal so obviously as the structures near or in the skin the disturbances of action which attend states of intense feeling." (2)

This glandular field of investigation makes interesting reading. Without necessarily sharing the extreme optimism of one of its outstanding and most enthusiastic supporters, Louis Berman, or making the rather too facile leaps at conclusions that may be found in his book "Glands Regulating Personality", we cannot help but realise the possibility of reducing the facts of personality to a more scientific basis. Here, at least, is something more or less tangible which may be capable of producing measurable results. With further advances in physiology the theory should be able to be tested thoroughly so that we shall at least know where we stand with regard to it. Whether we shall ever have formulae laying open our mystic innermost workings through such a science as the "chemistry of the soul" (3) is another matter.

(1) Cannon, op. cit. p.2.

(2) *ibid.* p.3.

(3) Berman op.cit., p.22.

The means to this end is by way of the ductless glands, or endocrine glands, whose internal secretions of hormones and chalone into the blood stream have, as is now widely recognised, a profound influence on the body economy.

The glands in question are:

- (1) Thyroid, situated in the neck, close to the larynx. The secretion thyroxin, is responsible for "energy production," and controls certain phases of growth. The cretin is a result of thyroid deficiency.
- (2) The Pituitary, in a well-protected cavity at the base of the brain a short distance behind the root of the nose. Pituitrin is concerned with energy consumption. In general it controls the tone of the tissues, of involuntary or smooth muscle fibres of the blood vessels and the contractile organs of the body, like the intestines, the bladder and the uterus.
- (3) Adrenals - each composed of two parts, attached to the Kidneys. They apparently facilitate brain growth and assist with sex functions and with removal of the causes of fatigue.
- (4) Gonads (sex ~~are~~ interstitial glands): concerned with secondary sex traits and general development.
- (5) Thymus, in chest, over the heart, is the gland that "dominates childhood". As far as is known it "keeps children childish and sometimes makes children out of grown-ups."
- (6) Pineal, at the base of the brain behind and above the larger pituitary. Little is known of its exact function

but apparently, like the thymus, it has a "hold-the-reins-tight-in-childhood function among the cells."

(7) Parathyroids - four tiny glands very close to the thyroid. They control lime metabolism and are a steady influence on excitability of muscles and nerves.

(8) Pancreas, within the abdomen. Its external secretion aids digestion, while its internal (insulin) helps to control sugar metabolism.

A vast amount of work is still necessary in the isolation of the secretions as well as in the discovery of the precise effects and extent of their activities.

Berman would have us believe that "the internal secretions with their influence upon brain and nervous system as well as every other part of the body corporation, as essentially blood-circulating chemical substances, have been discovered the real governors and arbiters of instincts and dispositions, emotions and reactions, characters and temperaments, good and bad." (1). There is little doubt here of this writer's opinion as to their field of work.

Dr. L. Williams was evidently of similar opinion:

"In the scale of evolution the brain and higher centres of the spinal cord are mere mushroom growths compared to our visceral ganglia, and practically coeval with them are the glands of internal secretion. While the time is not yet ripe for dogmatic statement there is a large mass of evidence which goes to show that the ductless glands constitute the mainspring of this surprising mechanism.

(1) op.cit. p.22.

(1) Quoted by Bloor op.cit. p.45.

"Nor does the importance of the endocrines stop here, for according to the exact proportion in which their essences are admixed in your blood, you are tall or short, dark or fair, phlegmatic or choleric, saint or sinner, sexual, homosexual or sexless, male or female...If man's conduct is determined by his endocrines, so also is his character, for character is only conduct so often repeated as to become habitual." (1)

The best method of indicating more fully the main points of this extremist view, with regard especially to the effect on character, will be to quote further passages from Berman's above-mentioned book.

"The internal secretion formula of an individual may, in the future, constitute his measurement which will place him accurately in the social system." (p.23).

In different individuals one or more glands gain a controlling influence over the others -

and "these glandular preponderances are at the basis of personality, creating genius and dullard, weakling and giant, Cavalier or Puritan. All human traits may be analysed in terms of them because they are expressions of them." (p.110.)

"Internal secretion traits are inherited."

"Given the internal secretory composition, so to speak, of an individual - his endocrine formula - and so his intravisceral pressures, one may predict, within limits, his physical and psychic make-up, the general lines of his life, diseases, tastes, idiosyncrasies, and habits," (and the converse) (p.111.)

Some of the master types are set out though there are also many variants, due to varying degrees of influence of the other glands.

1. One thyroid-centred type has	(Bright eyes
(Good clean teeth
(Symmetrical features
(Moist flushed skin
(Temperamental attitude towards life
(Tendency to heart, intestinal, and
(nervous disease. |
|---------------------------------|--|

(1) Quoted by Bloor op.cit. p.45.

- (Abnormally large or small size.)
 2. One Pituitary-centred type. (Musical-acute sense of rhythm.
 (Asymmetrical features.
 (Tendency to cyclic or periodic diseases.
 (Hairy
 (Dark.
 3. One Adrenal-centred type. (Masculinity marked.
 (Tendency to diphtheria and hernia." (p.112)

"The endocrine classification of the human race, applied to children, will yield a harvest to the educator and to the country. Nothing is more evident than the diversified nature of the needs of the various internal secretion types." (p.262)

"Periodic seasonal and critical fluctuations in the equilibrium among the hormones will have to be taken into account in the exploration of what have hitherto been put down to laziness, naughtiness, stuidity or obstinacy." (p.262).

"Every baby is born with a combination of nerve cells and ductless glands which determine its capacity for mental development." (p.263.)

"Schools will function as the developers, stimulators and inhibitors of the endocrines." (p.290)

"The raising of the general level of intelligence by the judicious use of endocrine extracts..." (p.291)

One obvious criticism that can be made of many of these claims is the lack of thoroughness with which the connection between the physiological and the psychological is established. For Berman, apparently, these two terms are, if not synonymous, little further removed. At the same time it is undoubtedly true that the endocrine glands do play a very important part in the functioning of our body mechanisms. The extent to which the secretions are capable of being catalogued and controlled, and, where necessary, adapted for purposes of human betterment, has yet to be discovered.

We must note, however, that the general nature of the

effects on the physical side are now being recognised by psychologists, as when McDougall, with reference to the special matter of our investigation, writes:

"We know that we have bodily organs the chemistry of which profoundly affects our temperament: and medical science can already intervene effectively to rectify some departures from the normal." (1).

And after reference to the proven effects of over or under-secretions of the better known glands, and the need for investigations in other fields to take due cognizance thereof, he goes on to say that

"no rebelling against the facts will abolish them... It is amusing to find that a philosopher who will discourse learnedly on the ancients' theory of the temperaments and the humours of the body may turn away in disgust and moral indignation when confronted with modern knowledge of the subject and the modern developments of the old theory." (2).

Cyril Burt, in "The Young Delinquent," writes:

"Along each of these two lines - from physiognomy and from glandular symptoms - much help in temperamental diagnosis may be anticipated in the near future from prolonged research." (p.414.)

A standpoint that would no doubt be upheld by a majority of psychologists is that "we cannot reasonably expect such a science (endocrinology) to solve all the problems of motivation, for human life and conduct seem to be more than chemistry and autonomic reflexes." (3).

A Recent brief, but informative, critical account of the existing position is to be found in the "Psychological Review" for 1935:

(1) "Character and the Conduct of Life", p.41.

(2) *ibid.* p.42.

(3) Thomson, *op.cit.*, 41.

"Secretions from the suprarenal cortex, parathyroid glands, and pancreas are necessary for life itself while in addition the anterior lobe of the pituitary body and the thyroid gland play leading roles in regulating the growth and function of all tissues of the body." (1).

It is shown, however, that many of the claims with regard to the effect on learning and on the general level of intelligence have not yet been proved. Similarly, the connection with the emotional side is still doubtful.

Important reference to our particular phase is made to the effect that "there is not any direct evidence to support the theory that differences in temperament among normal individuals are the result of differences in endocrine make-up." It is important to note that this statement is made with regard to the normal person. Studies of many cases of abnormal behaviour indicate that the deviations from normal personality are associated with endocrine disorders more frequently than chance will allow; though the association is not inevitable. In his general comments Ingle supports our point when he says:

"Many writers, probably as many psychologists as endocrinologists, have failed to make the discrimination between hypothesis and demonstrated fact in claiming and teaching that all somatic and psychologic differences have an endocrine basis."

It is an extremely difficult matter effectively to control experiments with glandular secretions for though it is very common to regard each endocrine organ as the sole

(1) Brown, W., "Mind & Personality", p. 123.
(1) Ingle, D.J., 123.

physiological source of the secretions produced by it,
 "it has not been demonstrated that this generalisation is
 strictly true of any endocrine body."

In short, what is needed (and this is all that can be
 demanded of any hypothesis) is a sane interpretation of the
 facts as established by science, without making any un-
 warranted claims before the essential data has been
 thoroughly tested.

To conclude this section on the endocrine glands,
 warnings by two eminent writers, one a psychologist, the
 other a psychiatrist, will be quoted.

"The theory of the influence of the glands upon
 personality has thrown such a flood of light upon
 the subject and has proved to be of such great
 value that some people have gone to extremes, and
 have rushed into print with highly coloured accounts
 of how the endocrine glands determine the nature of
 personality. It is quite sound to attach great
 importance to disturbing factors, but it is a
 different matter to say that the normal character
 as such is merely a chance mixture of various
 glandular influences from the body. That is to
 neglect the fundamental distinction between the
 pathological and the normal." (1).

(With this, compare Berman: "The standard of the
 normal must obviously not be a single standard, but a
 series of standards depending upon which glands predominate.")
 (2).

"The brain is at least the effective organ for
 all such activities as have an influence on the
 temperament even in so far as they proceed from
 the chemistry of the blood. The direct action
 of the brain can cause modifications of the
 temperament...It is very necessary to underline

(1) Brown W., "Mind & Personality", p.129.

(2) Berman, op.cit., 119.

"the obviousness of this so that we shall not fall from the extremist brain-anatomy theory into a one-sided view about secretions, which is the fashionable danger today." (1).

Summary of Classifications and Note on Present trend.

From the various classifications that have been noted earlier in this section the following two points emerge:

1. The tendency for the division into temperaments to have a physiological as well as a mental basis has been evident from ancient times to the present. This has been due in part to the recognition of the fact of the physical being largely an expression of the mental. Various attempts at character reading have been based on the assumption that personality is revealed by physical appearance. A more specialized example of this is phrenology. In every-day life, too, for our judgments of others, we depend to a considerable extent upon physical characteristics, actions, etc. Though perhaps not very closely connected with our more restricted subject of temperament, but nevertheless indicative of the possibilities (?) in this direction, a paragraph from an article by R.B. Bean is appended:

"The type may be decided by a careful inspection of the external form of the ear, nose, face, head and body form after one has become familiar with the types by prolonged experience. It is possible by the ear form alone to determine differences of ten feet in the length of the small intestine, of 500 grams in the weight of the liver, differences in the size of the brain, cerebellum, heart, kidneys, and spleen, in the position and shape of the viscera... Different human types represent different forms of intellect and different immunities and susceptibilities

(1) Kretschmer, op.cit., p.253.

"to disease, hence psychology and pathology become associated with anatomy and anthropology." (1).

2. Though temperament traits have been seen to be assessed in various ways there can be found certain common factors underlying many of these classifications. One of the very few writers who have analysed the position to this extent is Constance Bloor. She suggests that these bases can be assumed to be sensitivity, duration, direction, emotion, inhibition, which appears to be a satisfactory summary of the position (provided "emotion" is here used in its more restricted meaning). Miss Bloor, however, proceeds to distribute these factors upon a quantitative basis among the four old established names, with "cautious" added. This seems a very unnecessary and unprofitable procedure, but for general interest one example is given here:

"Sanguine Temperament: high sensitivity, low persistence, outward direction, weak emotionality and little inhibition." She continues: "Such a classification would mean that the position of a given individual could only be indicated by a five-dimensional graph. Convenience has doubtless given us a preference for the two-dimensional and if we were allowed to manipulate experimentally the above classifications we might produce one of the following nature -

	Initial Speed	Duration
Sanguine	high	low
Cautious	high	high
Phlegmatic	low	high
Melancholy	low	low " (2).

This means that Miss Bloor would reduce the factors of sensitivity, emotion, direction and inhibition to, as she

(1) Quoted by Downey, *op.cit.* p.17.
 (2) Bloor, *op.cit.* pp.142-3.

In dealing with temperament the characteristics which experiences show in their development would appear to be the soundest basis from which to work. This would not, therefore, exclude the element of speed though the preponderating importance attributed to it by some writers would be much reduced.

On reading some of the most recent accounts of temperament one cannot but notice the increased stress laid upon the factors of instinct and emotion, motivation and inhibition. Thus M.K. Thomson:

"As a factor in motivation temperament is more a mechanism than an urge. It colours the real impulses and motives, directs their paths and rate of speed. Although motivated by the same sort of drive the act will vary according to temperament.....The close connection between temperament and instinct is also significant." (p.110).

Though the writer is unable to state, as yet, that temperament is a primary urge, nevertheless, "whether primary or secondary or both, temperament must be reckoned among the factors of motivation."

Roback: "The play between determination and motivation in the diagnosis of temperament is a feature which takes on a decided colouring with the steady advance of dynamic psychology." (p.105).

Kretschmer: "The temperament works in with the activity of the "psychic apparatus", providing feeling, tone, inhibiting, and pushing forward." (p.252).

Bridges states that there appears to be a temperament based on each of the more important instincts e.g. fear has a temperamental parallel in timidity. Subjects differ in

temperament because they do not inherit all the instincts to the same degree. This writer also quotes Adler as emphasizing the dependence of temperament upon instinct. He adopts the idea of there being a compensating temperament for the opposite instinctive trend. (1).

Burt (2) found a general factor of emotionality to underlie instincts and emotions as general intelligence has been proved to underlie intellectual achievements.

The extent to which these various factors are determined by body functions is at present a most debatable point, but there is certainly sufficient evidence to demonstrate that a relationship does obtain. In support of this, and partly supplementing our previous references to endocrinology, we have -

Bernard: "The temperamental factors may conveniently be grouped in two principal classes: on the one hand, the influences exerted on the nervous system and through it on mental processes by the functioning of the bodily organs; on the other hand, general functional peculiarities of the nervous tissues." (p.253)

Aveling: "When our knowledge is more comprehensive and exact it may undoubtedly be found that conative output and duration as well as emotionality, are conditioned by the neuro-glandular system." (3).

Brown: "The formation and growth of any particular passion (or sentiment) are determined partly by external conditions, and more especially by internal conditions of which temperament, or as it might be called, "mental diathesis", is the most important." (4).

(1) Bridges, op.cit.

(2) "The Young Delinquent", p.506.

(3) "Personality & Will", p.157.

(4) "Psychology & Psychotherapy", p.81.

The excellent brief study of the position made by Bridges will be used again to conclude this sketch of the present trend.

After surveying the various possible approaches to the subject, Bridges finds that the results from each may not be incompatible. Thus the dominance of an instinct may be due to some endocrinological influence. Similarly, the internal secretions are probably subsidiary to the general autonomic functions. In his conclusion he states:

"The present indications are, perhaps, that temperament is at bottom a matter of autonomic segmental cravings and their relationship, and of the original and conditioned responses of the proficient apparatus in order to relieve these cravings or tensions" (Note: "Instincts" approximate to these "segmental cravings.")

And "Any attempt to develop a theory of temperament must take into account the following aspects:- relation of temperament to instinct, compensating factors, endocrine factors, autonomic functions, pathological manifestations, and inheritance." (1).

It seems, then, that any attempt to set out basic classification of temperament must at present remain a rather tentative operation. The field of temperament is so bound up with the various psychological and physiological processes that accurate observation of the different aspects in isolation can be regarded only as a future possibility. How, for instance, can it be decided whether "speed" is to be regarded as an attribute of an impulse or as the result of willing by act of will?

(1). Bridges, op. cit.

The most we can claim is that such more or less identifiable elements as persistence, strength, drive, direction, speed are probably sufficient to give an indication of a person's temperament; but that our present knowledge is such as to preclude any wider generalisations.

has in fact been explored in the search for testing devices. Some of these character tests have been put to practical use, especially in the U.S.A. which country, indeed, would appear to have given itself almost exclusive rights in this field. Of the vast amount of material in existence, however, much is of very doubtful worth, especially from a psychological view-point. Many of the so-called character tests measure little more than superficial characteristics the assessment of which may have some value in the business and industrial world, but their limitations must be recognised.

When the scope is narrowed to the field of temperament we find an almost complete absence of test material. The difficulties inherent in any treatment of this aspect of character, brought out already in this work, are sufficient explanation of this lack.

In 1934 a Consultative Committee of the English Board of Education completed a searching enquiry into the use of psychological tests of educable capacity. A quotation from this report will suffice to indicate in brief the little that has been done towards filling the need for such tests.

SECTION 4.TEMPERAMENT TESTS.

From time to time objective tests have been devised for the purpose of assessing various moral, social or ethical attributes of man. The whole realm of character has in fact been explored in the search for testing devices. Some of these character tests have been put to practical use, especially in the U.S.A. which country, indeed, would appear to have given itself almost exclusive rights in this field. Of the vast amount of material in existence, however, much is of very doubtful worth, especially from a psychological view-point. Many of the so-called character tests measure little more than superficial characteristics the assessment of which may have some value in the business and industrial world, but their limitations must be recognised.

(1) When the scope is narrowed to the field of temperament we find an almost complete absence of test material. The difficulties inherent in any treatment of this aspect of character, brought out already in this work, are sufficient explanation of this lack.

In 1924 a Consultative Committee of the English Board of Education completed a searching enquiry into the use of psychological tests of educable capacity. A quotation from this report will suffice to indicate in brief the little that has been done towards filling the need for such tests.

"Tests of Temperament and Emotion: Increased efforts have recently been made to measure temperament and character by methods more direct and exact, by tests similar to those which have been used for the precise estimation of "intelligence". But, although the idea of temperamental testing is almost as old as that of intellectual testing it has had quite a different career. Early observations and experiments upon the estimation of character and temperament were carried out by both Galton and Binet. Binet, in particular, besides his scale for intelligence, carried out many ingenious researches upon the measurement of conscientiousness, suggestibility and fidelity of description and report. But the first to approach the problem with an adequate statistical procedure was Dr. Naomi Norsworthy. The procedure itself was borrowed from that used by Professor Catell in a biographical study of American men of science. From her analysis of the various estimates of a teacher's personal character - estimates made independently by half-a-dozen students - Miss Norsworthy concluded "that it would seem possible, by the use of some such method as the foregoing" (measurement by relative position or ranking) "carried out on a much wider scale, to justify a list of character-traits, numerical estimates of which by competent people would be both reliable and significant." " (pp.54-55.)

It will be sufficient here merely to mention, by way of example, two tests that border upon the temperament side.

- (1) Koh's Ethical Discrimination Test which gives a fairly high correlation with tests of intelligence; whether or not morality itself is measured is difficult to say.
- (2) The Pressey X-O Test, which measures (a) total affectivity and (b) total idiosyncrasy; the test is based on the principle of association and would appear to have some merit despite a lack of objective control.

Recent accounts of new tests devised, though containing numerous references to general character tests, still fail to

from year to year, of only .12. (1).

take us much further in the matter of temperament testing.

The only temperament test that, so far as the present writer is aware, has achieved any real distinction is Professor June Downey's "Will-Temperament Test". Miss Downey holds that temperament is revealed in muscular movement and this her test measures by means of handwriting performed under varying conditions. Each sub-test is presumed to measure one of these twelve qualities: (1) Speed of movement. (2) Freedom from load. (3) Flexibility. (4) Speed of decision. (5) Motor impulsion. (6) Self-confidence. (7) Non-Compliance. (8) Finality of Judgment. (9) Motor inhibition. (10) Interest in Detail. (11) Co-ordination of impulses. (12) Volitional perseveration.

From the results the individual's "will-temperament profile" is obtained and is exhibited best by means of a graph. It has been found that the traits holding the highest average correlation with the eleven other traits are: Freedom from load; Speed of decision; Speed of movement; while those with the lowest average are Motor inhibition and Volitional perseveration.

Some writers consider that this test does, to some extent at least, measure temperament, though the more authoritative opinions lead us to doubt the validity of the claims made for it by the author. One investigator, J.B. Maller, finds a correlation of this test on the same subjects from year to year, of only .12. (1).

(1) Psychological Bulletin, 1934.

Various criticisms may be made, the chief being that the test is not sufficiently objective, that it takes too long to administer, that the scoring is difficult, and that practice in writing may affect the result.

We find, then, little to assist us in any attempt at temperamental diagnosis; and not until more definite factual knowledge of the meaning and classification of temperament has been acquired will it be reasonable to expect any further advance to be made towards the preparation of test material. Further reference to the need for such tests in educational practice will be made in the following section.

"Some of our witnesses suggested that teachers should observe more systematically weakness of character as well as weakness of intellect. Often what seemed an intellectual failing was really due to some temperamental defect. It was urged also that there was a definite need for teachers to be able to judge the more elusive characteristics of character and temperament. In the playground, as well as in the class-room, they had excellent opportunities for such observation; and many of them, owing to their special gifts and special experience, were quick and penetrating judges of youthful character. But they sometimes seemed to find difficulty in setting down what they had noticed in clear and accurate terms. Clearly formulated upon sound psychological principles, such judgments, it was asserted, would be of much greater value than the data afforded by any existing tests of temperament or morality." (2).

Constance Bloor (3) refers to the possibilities of modifying temperament by judicious diet to the effect that in time children and perhaps races might become less warlike, less sluggish, and less easily excited, according to the direction in which the corrective diet was administered.

(1) Report of Consultative Committee, p. 53.
 (2) pp. 94-95.
 (3) "Temperament", p. 186.

SECTION 5.APPLICATION FOR TEACHERS.

"Among the many factors that determine a child's educational progress, temperament and will are not less important than intelligence or knowledge." (1).

For the teacher the necessity for some knowledge of the temperamental make-up of each of his pupils is obvious. Not only is the effect of temperament to be seen in the child's scholastic progress, but also in his social adjustments.

The Report mentioned above also states:

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- (1) Report of Consulative Committee, p.53.
- (2) pp.94-95.
- (3) "Temperament", p.186.

This reference naturally leads us back to Berman's claims for endocrinology. The reader is referred to an earlier section, (3), for references to the possibilities of modification by the physician; for "the endocrine classification of the human race applied to children will yield a harvest to the educator". (1).

The position is that at the present stage of development of the endocrine doctrine it is impossible to estimate the precise effects which its elaboration would produce on educational practice.

"It is perhaps possible to say that assuming the laboratory manipulation of the glands to have reached the stage of perfection shadowed by Dr. Berman, the chief importance for the educator will lie in the classification rather than in the modification of personality. Such classifications will take their place side by side with Intelligence Tests in assessing the educability of the individual. They will also provide a valuable key to the treatment of the child from the point of view of educational method. In this connection it follows at once that they will strengthen the case for individual rather than for class teaching." (2).

Apart from the glandular possibilities, a satisfactory classification of temperaments would enable finer adjustments of matter and methods of teaching especially as applied to individual cases. While time only will tell whether the fineness of discrimination suggested by Miss Bloor in the following quotation will ever be possible, there can be no doubt of the latent possibilities.

(1) Berman op.cit., p.262.

(2) Bloor, op.cit., pp.191-2.

"While therefore, with a standard classification of temperament it would be possible to say: "Since the child has such and such a temperament, therefore to such conditions he will respond in such a way," as it is, failing such a classification, all that he can apparently do is to recognize the work of temperament when he sees its results in the child's reactions....The value of an increased knowledge will not be in the formulation of a few additional maxims of treatment but in the adaption which each teacher will evolve for himself from his knowledge of the children in his charge." (1).

For the purposes of this classification temperament tests would be of great value. However, as has been shown in the preceding section, such tests are not available. Reference to this is made in the English Consultative Committee's Report as follows:

"We are of opinion that no really trustworthy and satisfactory tests of those aspects of temperament which bear directly on educable capacity have yet been elaborated. If satisfactory tests of this type were developed in the future it seems possible that they might be of considerable use as affording important information bearing on educable capacity ancillary to the data derived from the application of "intelligence" tests. For the present, however, we would deprecate the use of any of the existing tests of temperament in schools. In our opinion the only satisfactory method of obtaining any trustworthy data regarding the temperament of individual pupils is the careful collation of reports submitted by competent observers, such as parents and teachers, who have been acquainted with the examinee during a considerable portion of his life, together with such information as can be obtained at a personal interview." (2).

This method of assessment implies that teachers must first formulate for themselves their own concept of temperament: for as any established classification of

(1) op.cit.195.

(2) p.132.

of temperament is lacking so is any standardized connotation of the term itself. It is only when this has been done that any real meaning can be given to the work of the educator.

In conclusion, a more general reference by McDougall:

"In the main then, understanding of temperament in ourselves and others is useful, not that we may modify it, but that we may take due account of it in charting the course of life for ourselves and others, and in marking upon the chart the snags and shoals we must avoid, the fairways in which we may hope to sail smoothly." (1).

PART II.

THE INVESTIGATION.

(1) "Character & Conduct of Life", p.43.

48.
PART I.

THE INVESTIGATION.

It is generally recognized that besides intelligence there are other factors involved which are likely to influence a child's progress at school. Whereas a measure of intelligence can reveal, under right circumstances, a child's capacity for learning, there is no guarantee that the promise will be fulfilled, for there is still to be reckoned the manner in which the child goes about his problems - his attitudes.

PART II.

Without encroaching too much upon the wider field of "character", THE INVESTIGATION. some fairly definite, yet representative, aspects of temperament could be selected and the attempt made to determine the extent of their effect on school progress. At the same time their influence could be compared with that of intelligence.

It was found that similar investigations had been carried out in England, and in particular one by D.W. Oates, reported in the "Forum of Education", 1929. An introductory paragraph from that source which is applicable here, states:

"The discrepancy preventing agreement between scholastic achievement and intelligence is due, not only to errors of measurement, but, but also to the presence of other factors. There are some subtle factors operating in scholastic ability. This investigation is to throw light upon the determining factors in successful school work." (1)

(1) "The Relation of Temperament & Intelligence to Scholastic Ability."

PART 2.THE INVESTIGATION.

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Without encroaching too much upon the wider field of "character", it was thought that some fairly definite, yet representative, aspects of temperament could be selected and the attempt made to determine the extent of their effect on school progress. At the same time their influence could be compared with that of intelligence.

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SECTION 3

Oates' work was carried out with Secondary School boys, while the present investigation is concerned with upper primary school children. Comparison of results, as far as similarity of methods can be admitted, should be of interest.

ment, reported in Part 1.

From the outset, however, the selection was limited by the consideration that the traits had to be such as could be measured or estimated with some degree of accuracy. Oates had decided upon "four dynamic traits, which, it was thought, should come definitely to the surface in the ordinary school environment." In an earlier article in the "British Journal of Psychology" (1928) he suggests, quite soundly, that the term "trait" may be taken to represent a "comparatively simple and apparently unitary function in the form of an innate reactive tendency." The traits he selected were persistence, control of attention, drive or impulse, speed.

Our findings in Part 1, and in particular the writings of McDougall, Roback, Aveling, Pear and Burt, support, in the main, this selection. In addition, other investigators in the "scholastic-temperament" field have used bases for assessment of temperamental or character qualities as follows:

1. June Dowsay, (1) whose twelve "qualities" may be

(1) op.cit., p.62.

SECTION 6.

TEMPERAMENT TRAITS.

THEIR SELECTION.

It was the desire to make a satisfactory selection of temperament traits that led to the survey of temperament, reported in Part 1.

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1. June Downey, (1) whose twelve "qualities" may be

(1) op.cit., p.62.

distributed under the three main headings of

- (a) Speed and fluidity of reaction
- (b) Forcefulness and decisiveness
- (c) Carefulness and persistence.

2. H.G. Stead, (1) under heading "Character Ratings" made assessments of -

- (a) Persistency
- (b) Trustworthiness
- (c) Conscientiousness
- (d) Changeability
- (e) Leadership
- (f) General excellence of character.

3. R.B. Cattell, (2) enumerates, as well as a lengthy list of other traits, those associated (a) with Webb's "w" factor (i.e. general character)

- Persistence in face of obstacles
- Perseverance
- Conscientiousness
- Kindness

(b) with Garnett's "c" factor (i.e. temperament type)

- Cheerfulness
- Sense of humour
- Quickness of apprehension
- Originality of ideas.

4. J.B. Russell, (3) under his "schedule of characteristics" has one heading, Temperamental, giving -

- (a) Attention (ability to resist distraction)
- (b) Persistence (perseverance in spite of difficulty.)

5. D.W. Oates, whose four temperament factors have already been quoted.

(1) "British Journal of Psychology", 1926.

(2) op.cit.

(3) "British Journal of Psychology" 1934.

Some of these investigations have covered more than the strictly temperamental field, hence the variety of traits enumerated. Within our more restricted field, then, had to be chosen traits that it was thought would be capable of satisfactory measurements. Those of attention and persistence seemed at once suitable for the purpose. Some doubt was felt as to the wisdom of including speed (for which, see Part 1) but its apparent ease of measurement, together with the fact that it would be of interest to compare results with those of Oates, who included this trait, led to the inclusion of this factor also. This gave three of the four traits selected by Oates. It was considered that his drive or impulsion, though of ultimate importance, was too difficult for rating purposes, and was omitted. (Oates himself found this to be the least satisfactory of his assessments.)

These three selected traits - attention, persistence, speed - are not regarded as exhaustively covering the sphere of temperament. The lack of unanimity among psychologists with regard to the definition and classification of temperament is alone sufficient to preclude this, while the point mentioned above, concerning "measurability", has further restricted our choice. These traits, however, should suffice to indicate whether any connection between school progress and at least some aspects of temperament does in fact exist.

(1) "Journal of Educational Psychology", Vols. 13 & 14.
(2) p. 400.

Method of Marking.

Another point to be decided was the method of marking the temperament traits. Two courses were open:

(1) Objective methods, using either tests already in existence, or tests to be devised especially for this particular investigation.

(2) Subjective ratings. Concerning the former, it has already been shown, in Part 1, that such tests have not proved satisfactory and the consensus of opinion seems to be against their use, at least until such time as more shall be known about temperament and character. Thus we were left with the second alternative.

Doubt is expressed by some writers, too, (notably H. Rugg, (1)) as to the value of subjective estimates, but there appears to be sufficient evidence in support of the procedure to justify its adoption here. C. Fox, for example, in "Educational Psychology", (2) writes:

"Various temperamental tests have been devised to assess temperamental differences, but so far none has proved satisfactory, and reliance has to be placed on general impression."

D.W. Oates, article in "British Journal of Psychology", 1928:

"Burt and Spielman place qualities such as quickness, energy, self-confidence and perhaps industry, that spontaneously emerge in test performance, among those for which subjective ratings have high reliability."

- (1) "Journal of Educational Psychology", Vols. 13 & 14.
 (2) p.409.

C. Spearman, "The Abilities of Man", (1) :

"The chief errors in estimating traits of character are - so far as hitherto established - of only two kinds; first, the random ones; and then, the bias of a judge for or against any individual all round."

Pintner, (2) regards the measurement of non-intellectual traits as of somewhat doubtful value, though he would admit the possibility of obtaining class averages therefrom.

C. Burt (3). After advising great care in the use of objective tests, he says that for his own work, in order to acquaint himself with the character and temperament traits of his charges, he had adopted the standardized personal interview, supplemented by the use of tabular schedules and rating scales.

Report by the English Consultative Committee (4):

"In assessing temperament and character we are bound to fall back upon the method of observation in place of the method of experiment. The personal interview is one recognized device: and another is the collation of reports submitted by competent observers."

It was decided to work upon a class basis, boys and girls separately. The school organisation has some composite classes but for this investigation all the Standard 3 boys were listed together, Standard 3 girls, etc. This meant that eight groups were formed. The numbers in each

(1) p.357

(2) "Educational Psychology", Chap. IV.

(3) "The Young Delinquent", pp.399-420.

(4) op.cit., p.59

SECTION 7.PROCEDURE.The Children:

In all, 272 children - 137 boys and 135 girls - were used for the investigation. They are pupils attending a Wellington Primary School. The district concerned may be described broadly as middle-class suburban, with some representation of both the so-called "higher" and "lower" strata, so that the children may be regarded as forming a fairly normal group for test purposes.

The girls' numbers, however, include 25 children from a St. Mary's Home. These girls, on the average, are of a slightly lower mental calibre, while in a few cases the consequences of unfortunate home environments are reflected in the difficulty with which social adjustments are made.

The boys and girls concerned constitute the senior division of the school - Standards 3-6, the great majority of their ages falling between $9\frac{1}{2}$ years and $13\frac{1}{2}$ years (at the time of the test.)

It was decided to work upon a class basis, boys and girls separately. The school organisation has some composite classes but for this investigation all the Standard 3 boys were listed together, Standard 3 girls, etc. This meant that eight groups were formed. The numbers in each group, or class, were in nearly all cases quite sufficient to warrant this procedure as in only two instances (Std.6 boys and Std.6 girls) were the numbers fewer than 30. By working

separately with boys and girls it was thought that some interesting comparative figures might emerge.

Table 1. Class Numbers and Ages.

(3) Other		No.	Average Age	Median Age	Quartile Deviation
S.3	Boys	39	10 yrs. 2 ms.	10. 0.	5 months.
	Girls	49	10 4	10 3.	6 "
S.4	Boys	36	11 4	11 4.	6 ¹ / ₂ "
	Girls	38	11 5	11 3	7 "
S.5	Boys	40	12 5	12 5	7 "
	Girls	31	12 6	12 6	5 ¹ / ₂ "
S.6	Boys	22	13 3	13 4	5 "
	Girls	17	13 2	13 0	5 "

The Data. This consisted of:-

- (1) Intelligence Test scores.
- (2) Scholastic progress.
- (3) Ratings for certain temperament qualities.

The Intelligence Test.

The Test used was the Otis Group, Intermediate Grade (as adopted by the Australian Council for Educational Research). The test was administered to the various classes concerned within a period of a few days, in each case at the same time of day (about 9.30 - 10 a.m.), and supervised personally by the writer.

From this, the raw scores obtained were used in the statistical part of this investigation. The reasons for using the scores and not intelligence quotients were:

- (1) The comparisons with School Progress and Temperament were to be made on a class basis, and the ages within each class formed a sufficiently homogeneous group for this

method to be pursued.

(2) The Intelligence Test score could be regarded as a measure of mental attainment or development, which is all that is required for the present purpose.

(3) Other investigators in this field, under apparently similar circumstances, have adopted this procedure; notably, D.W. Oates (1) and H.G. Stead, (2) the latter working under the supervision of no less an authority than C. Spearman.

The following table shows the distribution of scores obtained in the Intelligence Test.

Table 2.

Class	Average Score	Median	Quartile Deviation.
3 Boys) 3 Girls)	30 27	32 26	9 7
4 Boys) 4 Girls)	36 38	35 39	7 8
5 Boys) 5 Girls)	46 48	47 48	6.5 6.5
6 Boys) 6 Girls)	51 56	50 54	9 6.5

School Progress.

The children were to be assessed according to their scholastic attainment within their respective classes.

This was carried out on a five-point scale. Information for this evaluation was available from two main sources:

- (1) "The Forum of Education," 1929
- (2) op. cit.

(a) School Progress Cards. On initial entry into a primary school a child has recorded on an official card such information as age, parents' occupations, health record. Each year thereafter, or on promotion to a higher class, a summary is made, by the class teacher, of the child's attainment during that year in the various school subjects. This assessment is on a five-point scale, a mark of 1 indicating that excellent progress has been made; 2, progress above average; 3 average; 4, somewhat below average; 5 much below average. The subjects on which school progress most depends are Arithmetic and the English group (essay, grammar, reading), and it was from the Progress Card records of these two items that the assessments for this investigation were, in part, made.

(b) Class Examination Registers. The total marks obtained by each child in the 1937 mid-year headmaster's examination were noted and compared with the Progress Card measures of attainment, mentioned above. In cases of discrepancy adjustment was made. In the large majority of instances, however, this year's examination marks merely confirmed the assessments of last year. Where necessary, the actual examination marks for last year were also perused, though these, of course, would be embodied in the end of year Progress Card schedule. At the same time, this served as a means of making a check on teachers' markings as it was realised that there might be a tendency for some teachers to be over-generous with the numbers of any particular

grade allotted.

Table.3. Distribution of Assessments of Scholastic Progress.

	1	2	3	4	5
S.3 Boys	3	6	18	11	1
Girls	4	8	20	14	3
S.4 Boys	4	7	16	7	2
Girls	5	7	12	12	2
S.5 Boys	4	9	15	8	4
Girls	3	6	15	4	3
S.6 Boys	2	6	12	1	1
Girls	1	2	7	5	2
Totals	26	51	115	62	18

The slight tendency for the excess of "below average" totals in the lower standards may be due to the fact that some children of low mental calibre leave school before reaching the highest classes. In particular, the small group of St. Mary's Home girls may influence the girls' totals in this manner.

Note. The possibility of being able to use existing standardized objective tests was considered. It was felt, however, that as these had not been standardized for New Zealand school conditions, dissimilarity of curricula would render their use inadvisable. As it is, the school examination tests are set by one person, the headmaster, working upon a soundly graded scheme; and results obtained by this means would be less likely to be influenced by the

unaccustomed conditions of a novel test.

The Temperament Traits.

Reference has already been made to the reasons for the selection of Persistence, Control of Attention and Speed as the traits to be considered. It remains to indicate the methods adopted for their assessment.

The services were enlisted of the teachers of the classes concerned (i.e. Standards 3-6), together with a Std. 2 teacher who had last year taught most of the present Std.3. It was explained to them that they were being asked to make independent ratings on a five-point scale of the extent to which the qualities indicated by the three traits specified were evident in the children with whom they had had contact.

Particular care was taken with the explanation of the terms persistence, attention and speed, and the difficulties discussed. The need for isolating the factors concerned, when making the judgments, was emphasized, so that the danger of the assessments being "coloured" by extraneous factors could be reduced to a minimum. The traits were summarized in definitions, as follows:

1. Persistence: to be measured as the tendency to continue tasks in the face of obstacles; perseverance in spite of difficulty, or when the task is disagreeable. The attitude of the child towards problem work should assist in making this rating.

2. Attention: i.e. the amount of control of attention; the degree of readiness with which the child applies himself to his occupations, and the ability to resist distraction. This is not to be confused with persistence: it is rather the tendency to avoid change continually arising through fluctuating attention, or merely for the sake of change.
3. Speed: as evidenced in general mental and physical activities; speed in coming to a decision or in accomplishing the various school tasks.

Typewritten copies of these instructions were also provided for reference during the actual marking.

Decision had to be made as to the scale to be used, it being generally agreed by workers in this field that ratings on a 7-point scale provide gradations as fine as can be made with any degree of reliability. For the following reasons, however, the 5-point scale was adopted:

- (1) It was considered that for untrained observers a 5-point scale would present sufficient difficulty in itself.
- (2) New Zealand primary school teachers are accustomed to working on a 5-point scale in connection with the Progress Card annual assessments of scholastic attainment.

In the Progress Card scale excellence is indicated by 1, and the lowest degree of ability by 5; and a similar procedure was followed here.

Instructions as to marks to be given were issued as follows:

"The temperament trait

- (a) very strongly marked1
- (b) somewhat above the average.....2
- (c) of average strength3
- (d) somewhat below average4
- (e) decidedly below the average....5

The comparisons are to be made with the average boy or girl of similar age. The majority of cases will probably lie in the middle group, but not necessarily so. You may find it best to mark the extreme cases first, and then the others in respect to these."

Each teacher was supplied with a list of the children of his or her class who had been present when the intelligence test was taken: beside these names marks for each of the temperament traits were then inserted. In addition the teachers marked in similar manner those children now in higher classes whom they had taught in previous years, and with whom they were still in more less constant contact. This meant that in almost all cases two or more estimates for each child were available. Moreover, the writer himself had taught most of the children of the present Standards 5 and 6, either one or two years previously.

From these various estimates final figures for each child were then obtained. It was found that there was considerable agreement in the estimates made. Any serious discrepancies were referred back to the teachers concerned to see whether there were any particular facts which might be influencing one teacher's assessment of a child, and which might not be known to the others. If there still remained any considerable difference an approximate average mark was made, except in cases where it was possible for the writer himself to have, as it were, a "casting-vote", or where it was thought that one teacher's estimate was likely to be more reliable than another's. Wide variations of

estimate of the one child's traits were, however, quite infrequent.

Table 4.

Distribution of Ratings of
Temperament Qualities.

Traits	1	2	3	4	5
Persistence	36	69	97	55	15
Attention	30	51	112	60	19
Speed	16	49	112	69	26
Totals	82	169	321	184	60
%	9.9	20.6	39.3	22.4	7.3
Normal Curve % would be	3.5	23.8	45	23.8	3.5

Assuming that the base line of the normal curve extends from -3σ to $+3\sigma$ (1), the frequency for each of the five groups would be as stated in the last line of the table above. Though the actual figures show that the two extremes are over-weighted, the curve is an even one and may be said to be in reasonably close accord with the normal probability curve.

(1) Garrett, "Statistics in Psychology & Education", p.99.

Table 5. Correlations of Intelligence, Scholastic Attainment, & Temperament.

SECTION 8.

Class	No.	Intelligence and	Scholastic Attainment	Intelligence and Temperament	Scholastic Attainment and Temperament
<u>CORRELATIONS.</u>					
When the data relating to intelligence, school progress, and temperament had been checked and finalised, coefficients of correlation were taken out in order to determine whether there were any relationships existing among these factors, and if so, to what extent. For this purpose Pearson's "product-moment" formula was used -					
$r = \frac{\sum xy}{N \sigma_x \sigma_y}$					
which, from the nature of the calculations here involved, is convertible into:					
$r = \frac{\sum xy}{\sqrt{\sum x^2} \sqrt{\sum y^2}}$					
Note: 1. All correlations are significant.					

which, from the nature of the calculations here involved, is convertible into:

$$r = \frac{\sum xy}{\sqrt{\sum x^2} \sqrt{\sum y^2}}$$

The correlations taken out were:

- (a) between intelligence and each of the temperamental qualities.
- (b) between scholastic attainment and each of the temperamental qualities.
- (c) between intelligence and scholastic attainment.

This necessitated the calculation of 56 coefficients of correlation, the results of which are set out in the following table. It is surprising to find that some investigators do take similar correlations to more than two places. This would seem to give them merely a spurious accuracy that the nature of the data certainly does not warrant. In the first place, intelligence tests, especially group tests, cannot claim to have any greater reliability than, at best,

Table 5.

Correlations of Intelligence,
Scholastic Attainment, & Temperament.

Class	No.	Intelligence and			Scholastic and			Intell. & Scholastic.
		Persis.	Atten.	Speed.	Persis.	Atten.	Speed.	
S.3 Boys	39	.50	.63	.29	.51	.65	.24	.81
" Girls	49	.42	.44	.50	.68	.76	.43	.63
S.4 Boys	36	.39	.47	.78	.79	.76	.34	.63
" Girls	38	.55	.51	.70	.73	.69	.61	.74
S.5 Boys	40	.42	.48	.46	.64	.53	.71	.69
" Girls	31	.33	.31	.70	.67	.56	.70	.60
S.6 Boys	22	.67	.23	.65	.32	.53	.86	.62
" Girls	17	.41	.43	.59	.73	.66	.38	.63
(Boys		.49	.45	.54	.57	.62	.54	.69
Aver4 Girls		.43	.42	.62	.70	.67	.53	.65
ages(Total.		.46	.43	.58	.63	.64	.53	.67

Note:1. All correlations are positive.

2. The Probable Error varies from $\pm .04$ to $\pm .14$

Owing to their rather smaller numbers, the advisability of omitting Std.6 boys and girls from the averages was considered, but as their figures showed a fair consistency, this was not thought necessary.

Considering the nature of the data it was not deemed advisable to take out correlations to more than two places, though the second place was corrected where necessary. It is, in fact, rather surprising to find that some investigators do take similar correlations to more than two places. This would seem to give them merely a spurious accuracy that the nature of the data certainly does not warrant. In the first place, intelligence tests, especially group tests, cannot claim to have any greater reliability than, at best,

*8 or *9. Correlations between the most generally used group tests rarely exceed the latter figure. The rating of temperament traits, dependent as it is on subjective estimates, is in similar, if not worse, position, while even the measurement of scholastic progress is by no means perfect.

It is for this reason dangerous to attempt to read too much into any figures obtained: the most that can be expected is that certain tendencies will be evinced.

Reading down the five columns headed Persistence (2), Attention (3), and Intelligence-Scholastic, emphasizes this uniformity, but it must be noted that the two "Speed" columns do not display the same regularity, though there are positive correlations in every case. Speed, as a temperament trait will be discussed later, so far the present, attention will be directed to the remaining columns of coefficients only.

Of the 16 correlations between Intelligence and Persistence-Attention, no more than 4 exceed *.50, with a combined average of *.45; those between Scholastic and Persistence-Attention show only one (of 16) to be less than *.50, while the average here is *.64.

Reading the Table in a slightly different way, by comparing the correlations of Scholastic and Persistence-Attention with those of Intelligence and Persistence-Attention class by class, we find the former exceeding the latter in every instance except one.

This contrast in results would seem to indicate that

SECTION 9.

INTERPRETATION OF CORRELATIONS.

It will be seen from Table 5 that there is a considerable degree of uniformity of result, from class to class. The occasional rather wide divergences from the average may be attributed to: (1) the comparative smallness of numbers, and (2) the impossibility of obtaining any very high degree of accuracy with the means of measurement at our disposal.

Reading down the five columns headed Persistency (2), Attention (2), and Intelligence-Scholastic, emphasizes this uniformity, but it must be noted that the two "Speed" columns do not display the same regularity, though there are positive correlations in every case. Speed, as a temperament trait, will be discussed later, so for the present, attention will be directed to the remaining columns of coefficients only.

Of the 16 correlations between Intelligence and Persistence-Attention, no more than 4 exceed $\cdot 50$, with a combined average of $\cdot 45$; those between Scholastic and Persistence-Attention show only one (of 16) to be less than $\cdot 50$, while the average here is $\cdot 64$.

Reading the Table in a slightly different way, by comparing the correlations of Scholastic and Persistence-Attention with those of Intelligence and Persistence-Attention class by class, we find the former exceeding the latter in every instance except one.

This contrast in results would seem to indicate that

there is some essential difference between the factors operating in each case, and that the difference is something more than could reasonably be attributed to chance.

The correlations between Intelligence and School Progress show a remarkable consistency, though perhaps no more than is to be expected. It serves to indicate, however, that some degree of reliability may be attributed to the measurements originally made under these two headings.

Sex Differences.

It was thought that some slight differences of result might be found between the boys and the girls, but Table 5 shows us little in this respect. The only point that might be made is from the correlations between School Progress and Persistence; and, much more doubtfully, with Attention. In each case, in three of the four classes, the girls show a higher correlation than the boys. Can we say from this that the qualities of Persistence and Attention are reflected rather more in the school progress of girls than of boys? The figures here are certainly not such as to justify any sweeping statement, though the writer's personal observation of Primary School children leads him to believe that a slight difference in this respect might quite well obtain. It may be, of course, that our judgments tend to become prejudiced, one way or the other, owing to the inherent natural differences of the sexes. In any case, the

(1) "Journal of Educational Psychology", Vol. 17.
(2) op. cit.

differences exhibited in the present results are so slight that later tables to be used will not differentiate the sexes. to be very low: .125, as against the present figure of .49.

Class Differences.

No definite trend is to be found between class and class. Some support for this is to be found in an investigation conducted by W.H. Hughes (1). He found that of the twelve character traits with which he dealt, those that concern us here all showed a fairly high correlation from year to year with no noticeable variations with increasing age. Intelligence section: they average .533, Stead's .335, and

On the other hand, there is evidence showing that temperamental factors become increasingly important as the subjects grow older. Stead (2), for example, found this to be the case. writer .67.

To detect differences in this respect, however, would be possible only when dealing with large numbers of children, and with a fairly wide age-range. is probably due, in the main

to one, or both of two causes:

Comparison with Other Investigations.

Before leaving the general study of the figures shown in Table 5 it is interesting to compare the present results and those obtained by D.W. Oates and H.G. Stead in somewhat similar investigations, already cited.

(1) "Journal of Educational Psychology", Vol. 17.

(2) op.cit.

Working with Secondary School boys Oates found the average correlation of the section Intelligence-Temperament Traits, to be very low: $\cdot 186$, as against the present figure of $\cdot 49$.

His separate class figures, however, show considerable variation, and though several correlations work out at $\cdot 4$, $\cdot 5$, or $\cdot 6$, negative ones have a strong effect on his averages.

Stead's results for the same section are more consistent and average $\cdot 305$.

In the section Scholastic-Temperament, Oates' results are much more consistent than in his corresponding Intelligence section: they average $\cdot 583$, Stead's $\cdot 335$, and the present writer's $\cdot 60$.

Average correlations in the section Intelligence-Scholastic Progress yield the following: Oates $\cdot 311$, Stead $\cdot 573$, present writer $\cdot 67$.

It will be noted that in each instance the correlations obtained from the present investigation are higher than those of Oates or Stead. This is probably due, in the main, to one, or both of two causes:

(1) The assessments of the temperamental qualities by the teachers concerned in the different investigations may vary in the degree of exactness obtained. Then again in spite of a general similarity, the traits dealt with are not precisely the same in any two of the investigations.

(2) The fact that the children are not all at the same

stage of school life may be a contributing factor. Oates was dealing with Secondary school pupils, Stead with Junior Secondary (aged 11-15), and the present writer with Primary children (aged 9-13)

MORE DETAILED ANALYSIS OF RESULTS.

By taking the average of the coefficients in each section we can set out both the observed and the partial correlations between Intelligence, Temperament and Scholastic Ability.

Table 6.

	Observed Coefficient.	Partial Coefficient.	Factor Eliminated.
Intelligence & Scholastic	•67	•54	Temperament
Temperament & Scholastic	•60	•42	Intelligence
Intelligence & Temperament	•49	•15	Scholastic

To obtain the partial correlation figures the usual method was adopted, following the formula:

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

These results point to the fact that Intelligence and Temperament are both essential factors in school progress, and that they are comparatively independent of one another.

Note on the "Speed" Trait.

Doubt was expressed earlier in this thesis as to the justification for including Speed in the list of temperament traits. The statistical work carried out has indicated that the element of Speed does not exhibit any very close conformity with the other selected traits. From Table 5 it can be seen that the correlations of Intelligence and Scholastic Ability with Persistence and Attention show little variation either from class to class or from the averages. On the other hand the average correlation of Speed with Intelligence shows a slightly higher figure than with Scholastic Ability, which result contrasts with the corresponding figures from the other traits. In themselves these points may not be of significance, but further statistical evidence throws more light upon the matter. By obtaining the partial coefficients of Intelligence and Scholastic Ability with each of the Temperament traits separately the following striking results are obtained:

"It will be noted that "quickness of thought" and "memory" stand at the top. This, no doubt, is due to the fact that these two traits are important elements of intelligence and should therefore be expected to correlate most highly with intelligence." (The trait "quickness of thought" may be assumed to correspond fairly closely with our "speed".)

J.B. Russell, working on "The Relation of Intellectual, Temperamental and Other Qualities to Success at School" (1)

(1) "British Journal of Psychology", Vol. 24, 1934.

Table 7.Correlations with Separate
Temperament Traits.

	Observed Intell.	Coefficient Scholas.	Partial Intell.	Coeff. Scholas.
Persistence	•46	•63	•07	•49
Attention	•43	•64	•00(2)	•52
Speed	•58	•53	•35	•23

These figures appear to lead to the conclusion that "speed" may be a trait not altogether independent of intelligence. This theory is supported, too, by the results of the investigation carried out by W.H. Hughes in 1926, and referred to previously. Twelve "important traits" were rated for Junior and Senior High School pupils and the correlations between these traits and intelligence were worked out. The results in so far as they interest us here may be stated by quoting from the author himself:

"It will be noted that "quickness of thought" and "memory" stand at the top. This, no doubt, is due to the fact that these two traits are important elements of intelligence and should therefore be expected to correlate most highly with intelligence."

(The trait "quickness of thought" may be assumed to correspond fairly closely with our "speed".)

J.B. Russell, working on "The Relation of Intellectual, Temperamental and Other Qualities to Success at School" (1)

(1) "British Journal of Psychology", Vol. 24, 1934.

included in his schedule of characteristics, "quickness", under the sub-division Intellectual. The sub-division Temperamental included only the two traits, Persistence and Attention. This, together with apposite references by L. Klages (1) and J.W. Bridges (2), lends further support to the point being made here. (Note reference also made in Part 1.)

It is worthy of note, too, that of the correlations made by Oates between Intelligence and each of his Temperament traits, that between Intelligence and Speed gave the highest average ($\cdot 309$), as against the next highest ($\cdot 189$). Stead did not include Speed as one of his character traits.

It is not claimed that "speed of reaction" is not to be regarded as a factor in temperament, but there is certainly some doubt as to the precise position of this trait; that it bears some relationship, at least, to general intelligence appears evident.

Table 8. Comparison of results with those of Oates and Stead.

	1.	2.	3.	4
Partial Coefficients.	Oates	Stead	Present	Present, with Speed omitted.
Intelligence & Scholastic	$\cdot 254$	$\cdot 568$	$\cdot 54$	$\cdot 56$
Temperament & Scholastic	$\cdot 563$	$\cdot 243$	$\cdot 42$	$\cdot 49$
Intelligence & Temperament	$\cdot 0037$	$\cdot 067$	$\cdot 15$	$\cdot 07$

(1) op. cit. p. 148.

(2) "Psychological Review", 1923.

Intelligence and Temperament.

If the temperament traits are restricted to those of Persistence and Attention (i.e. omitting Speed) the partial coefficients shown in column 4 are obtained, as contrasted with those in column 3. The correlation between Intelligence and Temperament is then found to follow very closely the relation, or rather the lack of relation, between these two factors as found by both Oates and Stead, the figures reading, Oates $\cdot 0037$, Stead $\cdot 067$, and present $\cdot 07$.

Intelligence and Scholastic Ability.

The comparatively low correlation obtained by Oates, between Intelligence and Scholastic Ability (raw $\cdot 311$; partial $\cdot 254$) seems rather surprising, even after making allowance for the fact that he was working with Secondary School children with whom it might be expected that temperamental qualities would have a somewhat greater influence on school work, and intelligence a correspondingly smaller influence, than with younger children. The differences in general educational conditions between the two countries, England and New Zealand, may also be a contributing factor.

The writer's figures read $\cdot 67$, and partial $\cdot 56$, indicating a fairly close relationship between Intelligence and Scholastic Attainment. Stead obtains results very similar, $\cdot 576$ and $\cdot 568$.

J.B. Russell (1), too, found a considerable agreement - 61 per cent - between intelligence and final examination results (Secondary School pupils.)

J.H. Wilson (2), in an article "A Comparison of Certain Intelligence Scales," reports that he found the average correlations between the various group intelligence tests and examination marks (of Primary School children, Standard 3-6) to lie between .4 and .5, with a highest single correlation of .73.

A.M. Jordan (3) reports two investigations. In one, "Correlations of Intelligence Tests with Grades", he found that the correlations average between .4 and .5 for intelligence and "grade points" (i.e. High School progress marks); in the other, "Validation of Intelligence Tests", he says: "With average grades the correlations of the four group tests are grouped around .47."

Temperament and Scholastic Ability.

The results obtained by the present writer indicate that there is some positive relation between certain temperamental factors and scholastic ability. By averaging the coefficients of the temperament traits with scholastic we find (Table 6 above) that there is a correlation of .60, and with the intelligence factor eliminated, a partial

(1) op.cit.

(2) "British Journal of Psychology" 1924.

(3) "Journal of Educational Psychology," Vols. 13 & 14.

coefficient of .42. With this compare Oates .583 and .563, and Stead .335 and .243. It must be noted, though, that Stead was working with character traits in general, not restricted to the temperamental aspect. In this instance then, his results are not strictly comparable.

The position is better illustrated by further reference to Table 7, (page 73,) which shows the correlations between scholastic attainment and each of the temperament traits separately.

Persistence and Attention give very similar results, .63 and .64, with Speed slightly lower, .53. The effect of eliminating intelligence lends further support to the conclusion that Temperament (as represented in particular by the traits of Persistence and Attention) is largely independent of intelligence.

The figures here do not justify such a definite statement as Oates is able to make from his results, that temperament is independent of intelligence, though there is considerable agreement except in regard to the factor of Speed, which has already been discussed.

Table 9 compares the present results with those of Oates.

	Oates			Present		
	Observed	Partial	Diff.	Obsrvd.	Partial.	Diff.
Scholas. & Persist.	.607	.596	.011	.63	.49	.14
" & Atten.	.553	.552	.001	.64	.52	.12
" & Speed	.597	.532	.045	.53	.23	.30

ANOTHER APPROACH.

A supplementary method also was used for comparing Intelligence and Scholastic results with the Temperament traits.

(a) From each class those with the highest intelligence scores were listed, together with their temperament ratings. In this case, however, those whose ages were beyond the quartile deviation for their class were excluded. It was found that no more than three had to be omitted on this account: indeed the tendency was for the highest scores to be obtained by children slightly below the class average age. This is in accordance with general findings, as exemplified by A.M. Jordan (1) when he finds that "with age the correlations of group (intelligence) tests are negative. This substantiates the usual dictum that in not too large a range the younger pupils are, on an average, the brighter."

(b) Children with lowest intelligence scores were similarly listed.

The selection made in each case was a perfectly arbitrary one and it is realised that the method is not capable of strict statistical justification, but it was felt that the point being made was worth investigation in this manner. The numbers concerned were (a) 37, and (b) 42.

(c) The children with the highest and lowest scholastic gradings, 1 and 5, were then listed in similar manner, the (1) op.cit.

numbers being 26 and 18.

The average ratings for each of the three temperament traits were obtained for the four select groups. Results are as follows:

Table 10. Average Temperament Ratings for Highest and Lowest Intelligence and Scholastic Groups.

		Persis.	Atten.	Speed.
Highest	{ Intell.	2.0	2.1	2.2
	{ Scholas.	1.4	1.6	2.1
Lowest	{ Intell.	3.3	3.5	3.8
	{ Scholas.	4.2	4.0	4.1

This table confirms and extends our previous findings. The highest scholastic group has a definitely higher average for the traits of Persistence and Attention than has the highest intelligence group. We note, again, the fact of Speed giving results dissimilar from those of the other two traits.

The low-Intelligence and low-Scholastic group also conforms to expectations. Low scholastic ability is apparently due to something more than a lack of general intelligence.

Conclusions.

From the results obtained the main trend has been to show that temperamental factors are of undoubted importance in school progress. Before finally summarizing these results, however, it will be in point to quote from the findings of J.B. Russell, whose work in this field has already been mentioned:

"For success at school, intelligence must not fall below a certain level, different for different individuals, but the brilliant boy with defects of character, may fail, while the boy of average intelligence, coupled with abnormal powers of perseverance and determination to succeed may surpass comrades possessed of greater inborn potential ability." (1).

And the same writer quoting Godfrey Thomson -

"Persistence and hard work may explain many a slowly developing child without any need to suppose that he had become more intelligent; and lack of these qualities may explain the reverse phenomena without any actual change in intellect having occurred."

The part played by temperament is indicated by H.G. Stead (2) when he states that scholastic tests measure the firmness of control over the "fund of intellectual energy" and the extent to which the subject can apply this control continuously.

(1) op.cit.

(2) op.cit.

Of the temperament traits dealt with, persistence and attention have shown great similarity of result, while speed, though evincing similar tendencies in general, has left us in some doubt as to the part it plays in mental activity.

The fact that positive, though fairly low, correlations were found between intelligence and temperament may be evidence towards an actual relationship, though it is possible that such correlations result from a certain overlapping due to the difficulty in isolating the factors in question.

Perhaps the most immediately applicable point from our findings is the justification of the statements made in Section 5, above, to the effect that it is incumbent upon teachers to realize the importance not only of intelligence but also of temperament.

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