CHAPTER I

INTRODUCTION

1.1 Individual Differences
1.2 Intelligence and its testing
1.3 Aptitudes
1.4 Summary

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1.1 Individual Differences

"Every human being is unique," says a modern psychologist.[1] "Every human mind differs from each other," (विंडे विंडे मतिर्भिन्ना), says an ancient Indian aphorism[2] and in the ancient Greece, Plato expressed the same in his well-known statement: "No two persons are born exactly alike, but each other differs from each in natural endowments, one being suited for one occupation and other for another."[3]

The fact that the individuals differ from each other is obvious and has been recognised since the organisation of group life in man. "Man has always been aware of differences among his fellow beings... in the earliest records of human activity (and in) pre-literate cultures."[4] This knowledge is the origin of most of the human sciences, having man as their

1. J.P.Guilford, General Psychology, p.483.
2. Vishnudev Sankleshwar Pandit (tr.), Subhashit Niti Manjari, (सुभाषित नीति मंजरी), sloka 264, p. 70.
3. J.L.Davies and D.J.Vaugham (Trans.), The Republic of Plato, Book II, quoted in A.Anastasi, Differential Psychology, p.3.
4. A.Anastasi, ibid., p. 1.

subject, such as anthropology, socioloty, psychology etc. Inspite of the uniformity as well as commonness among themselves, each individual behaves in a specific way. His own individual way of responding to a stimulus is a self-evident activity, known from the earliest times, evidences for which are many.

In ancient India, "the cradle of civilization" we find a stress on the differences in individuals mentioned in all sacred and literary books.[1] In his excellent book Dasgupta cites a plethora of evidences in this respect, of which the present writer would quote only a few. He quotes Jaimini, an old Indian scholar in the times of Vedas, which is considered the earliest literary activity of mankind, as saying, "Individuals differ from one another in their capacity or incapacity."[2] The ancient book Çaraka Samhita, the materia medica of the Indian system of medicine also refers to the individual differences.[3] Anastasi, sketches a historical development of this concept in the West and refers, besides the above mentioned statement of Plato, to the age of Aristotle, Scholasticism, Associationism etc., where references were made to these differences.[4]

Inspite of this awareness and knowledge about individual

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1. D.C.Dasgupta, Educational Psychology of the ancient Hindus, p.
2. quoted in ibid., pp. 118-119.
3. Caraka Samhita (चरक संहिता), ch. IV, Sarirsthanam, p. 323.
4. Anastasi, op. cit., p. 3.

differences in the past, a scientific study was probably initiated in 1796, by an unusual phenomenon. Maskelyne, the Astronomer Royal at Greenwich Observatory, dismissed Kinnebrook, his assistant because the latter observed the times of stellar transits nearly a second later than the former did.[1] In 1816, Bessell, an astronomer at Königsberg read of this incident and became interested in measuring what was called, "personal equation" of different observers. This conisted of the variation of time for each observer. According to Anastasi, this represents the first published record of quantitative data on individual differences.[2]

The study of individual differences was further stimulated by the various developments, in the 19th Century, in the fields of Biology, Genetics and Physiology. In Psychology this concept became the starting point of several contemporary and future studies by Galton, nephew of Darwin who applied evolutionary principles of variation, selection and adaptation to the study of human individuals.[3]

Coming to Galton, it is appropriate to describe his contributions in the development of scientific methodology in psychology. He was a genius and "in his wealth of novel ideas, Galton is indeed without a parallel in the whole of modern

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1. ibid., pp. 3-4.
2. ibid.,
3. ibid., p. 5.

psychology."[1] His "claims as a founder of a new method in psychology are no whit inferior to Wundt's,"[2] and that, "modern psychology as in independent science is fortunate in having such a man, and one of such calbire, in its brief history."[3] Galton's special work was his studies in individual differences, though his genius encompassed a wide field. To Galton falls the credit of pointing the way to an individual psychology on an experimental basis.

We may appropriately say that this concept of individual differences in psychology is the starting point of modern scientific psychology. Its applications were many in the early period, in experiments on sensory discrimination, reaction time, and individual skills. The study of individual differences is now an important branch of psychological study under the distinctive title of "differential psychology."

1.2 Intelligence and its testing

Ancient times.-- Here we have again an occasion to refer to the studies in ancient India as these show that the concept of intelligence was a central one for all students of human mind from very early times. In fact, many of the old Indian books of philosophy contain a thorough analysis of the intellectual processes of man. Although, these analyses were made to

1. J.C.Flugel, A Hundred years of Psychology, p. 105.
2. Karl Pearson quoted in ibid., p.110.
3. ibid., p. 111.

help individual attain the goal of spiritual liberation,[1] various intermediary intellectual processes were also wonderfully analysed. The philosophies of some Upanishads, Sankhya-Yoga, Buddhism and Jainism devotee a substantial portion of their contents to such analysis.

It is interesting to note that in all Aryan languages the term connotating "man" is a derivation from the root which means mind. This again can be traced to the Sanskrit word "Man" or मनस् "Manas", meaning mind. As referred above, there has been an effective analysis of the various facets of the mind which is the essence of man, and the probability of its being measured is also indicated. According to Saraswati, the Sanskrit word for mind ~~is~~ Manas मनस् literally means, "measuring"[2] and it was used in this sense in the early Vedas and Brahmanas. Thus, while on one hand an individual is "measured" by the degree of intellect he possessed, this also probably implied that mind had the property of <u>being measured</u>.

What was the exact idea of measurement in the early days, and how this was done is very difficult to describe. The subject is dealt with in a scattered way, ~~but~~ and is incorporated in several literary and philosophical texts, but it is

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1. expressed in such statements as मन एव मनुष्याणां कारणं बन्धमोक्षयो (mind is the cause both of the enslavement as well as the liberation) or सा विद्या या विमुक्तये (the true knowledge is one which liberates.)

2. SaraswatiChennakesavan, <u>The concept of mind in Indian Philosophy</u>, p. vii.

clear that the concept was thoroughly analysed. Attempts were also made for suitable measurement to enable prediction of success in vocation, and for selection. A statement of "qualities of intelligence" by the great Indian scholar, Kautilya, in his famous Arthsastra reads like any modern definition of intelligence. According to Kautilya, "Inquiry, hearing, perception, retention in memory, reflection, deliberation, inference and steadfast adherence to the conclusions are the qualities of the intellect,"[1] a definition very close to the various global definitions, stated later in this chapter. Kautilya further says, "a man's ability is inferred from his capacity shown in work"- a striking parallel to the modern concept that intelligence is manifested in the work and cannot probably be defined. Jaimini, a Vedic scholar, classifies persons accordint to their intellect, and Asvaghosh, quoted by the same writer "classifies people with rare genius, superior, average, mediocre and retarded intelligence."[2] Caraka Samhita lays down in details the intellectual qualities of the students who came to study.[3]

That the intelligence was "tested" in a suitable manner is evident from the statement of Vishnusharma who is quoted by Dasgupta as saying to an applicant, "but it was necessary

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1. R.Shamsastri (trans.) Arthasastra by Kautilya, p. 319, quoted in Dasgupta, op. cit., p. 123.
2. Dasgupta, loc. cit. sutra-3.
3. Caraka Samhita, op. cit. sutra 3.

to test your intelligence."[1] The existence of "Dwarpandits,"[2] the examining scholars who examined each applicant to the Universities and assigned each to a specific course is also an instance, how an attempt was made in accordance with the times and the knowledge at their disposal, to assess the intelligence. What is more important for us is that the fact of individual differences was recognised and it was believed that the intelligence was reflected in the performances and could be assessed. In ancient Greece, too, in times of Plato, there was a careful selection according to the intellect and degree of skill gained.[3]

Modern times.-- The efforts to describe intelligence as shown above continued from the earliest times, but they probably lacked the scientific methodology for the objective assessment and examination. This trend began in the middle of 19th Century when the scientific spirit dominated Europe and in several branches of knowledge, especially physics, medicine, genetics and biology, several phenomena were described and scientific laws observed. This was a period of great natural scientists, and there was a spate of activities in application of scientific discoveries for the welfare of humanity. The Industrial Revolution in England had set in the Steam engine was invented,

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1. Vishnusharma, Panchtantra, quoted in Dasgupta, op.cit., p. 124.
2. A.S.Altekar, Education in ancient India.
3. Anastasi, op. cit., p. 3.

Faraday and Franklin had discovered the electricity and used it for human welfare, Gallileo had already revolted against the set of theories of universe and Darwin had propounded a new theory of evolution. Earlier, Newton had discovered his famous laws of gravitation. In other words, this was a period of great challenge and great tumult. The age of Science had begun and the scientific methodology of objective observation and experimentation had already taken roots.

The advances in these natural sciences did not leave human sciences untouched, and there was a spirit of activity in these areas also. Darwin's animal experiments, Mendel's laws of heredity and the discovery of statistical techniques signalised the extension of these contemporary influences in psychology. The works of Fechner and Helmholtz, primarily in the fields of psychology and medicine were followed by Wilhelm Wundt, who founded world's first psychological laboratory in Leipzig in the year 1879. Psychology had come out of the shell to rank with other sciences as an equal and independent branch of study, the study of individual and his behaviour. Most of the work on psychological processes had so far been a bye-product of researches in philosophy, medicine and physiology, and credit goes to Wundt, who himself was primarily a medical man, to give experimental psychology and the status of an independent science. When we know that among his students were great scholars wh from all over Europe

and America, who were later regarded as founders of modern psychology, we can assess his gigantic contribution to the development of modern psychology. Boring[1] gives "almost a complete list" of Americans; Stanley Hall, Cattell, Wolfe, Pace, Scripture, Angell, Witmer, Warren, Patrick, Stratton, Judd, Tawney. Among his European students were Kraeplin, Muensterberg, Störring, Kirschmann, Lehmann, Kuelpe, Meumann, Marbe, Kiesow, Lipps, Krüger, Merkel, Lange, Martius, and the renowned Englishman, Titchner.[2] These all were great experimentalists in their own right and helped psychology to become an independent branch of study. Spearman was a student of Wundt and Mueller, before becoming interested in the problems of intelligence and factor-theory. Late Dr.S.C.Mitra was also a student of his laboratory and was perhaps the first Indian to be so trained outside India.

Along with the development of experimental Psychology, development of statistical techniques also helped the convergence of diversified theoretical polemics on intelligence, to a more specific possibility of objective measurement of intelligence. The stress now shifted from mere theoretical interest in problems of intelligent activities, of man and animals[3] to a more objective assessment of intelligence and some tests were also devised. Principal among the first

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1. quoted in Flugel, op. cit., p. 150
2. ibid.,
3. for example, in W.Kohler, Mentality of Apes.

contributors to the testing movement were Ebbinghaus in Europe and Cattell in the U.S.A.

The real work in intelligence testing, however, is considered to begin with Alfred Binet who is acclaimed as the "Father" of modern mental testing.[1] Although before him some work in testing especially in areas of sensory discrimination was already done, Binet is the first man who devoted himself to a preparation of a scientific tool to measure intelligence, as expressed in higher mental processes. The occasion was provided by the assignment to Binet, the task of studying the "backward" child and finding a way to identify these from normal. Binet along with Simon prepared a point-scale in 1905 which virtually became the world's first serious attempt at preparation of a tool to assess objectively the intelligence of a child. The scale was revised in 1908 and again in 1911. The point scale was revised to an age scale in the later revisions. In preparing these, they were guided by the earlier works in the field of testing and according to Guilford, they found many scattered tests already in existence. Their task was to collect them, to add some tests of their own and to construct a scale.[2]

The first American revision by Terman and Merrill appeared in 1916, revised in 1935 and later in 1960. Several versions

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1. F.S.Freeman, Theory and Practice of Psychological Testing, p. 157.
2. Guilford, op. cit., p.485.

were also published, and in India Rice[1] published, in 1916, a point scale based on the earliest form of the test. Incidentally, this was the first reported intelligence test in India. Later several other revisions appeared; notable among them were the adaptation by Kamath in Marathi and Kannada;[2] by Shukla in Gujarati;[3] in Bengali by Ghosh and Sen[4] and in Hindi by Bureau of Psychology, U.P., Allahabad.[5]

The test has stood the test of time and though is the earliest, is still regarded as one of the most useful instruments to assess individual intelligence. "Not only has this instrument been for many years the most widely used individual intelligence scale, but it has also been so highly regarded that it has served as a Yardstick, against which many other tests have been compared."[6] According to Cronbach, "A history of mental testing is in large part a history of the Binet tests and its descendants."[7]

After the publication of Binet tests, there has been an enormous increase of the testing activity, and testing has been one of the most popular branches of psychology. The preparation of intelligence tests depended upon the theory

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1. J.M.Ojha, "Intelligence testing in Gujarati language," Education and Psychology, Mental Testing no. (1954:4-5), pp. 26-35, and also in S.Jalota, "Intelligence Testing in India," Ind. Psychol. Rev., 1:96-112 (Jan. 1965).
2. V.V.Kamath, Measuring Intelligence of Indian Children.
3. J.M.Ojha, "Intelligence Testing in Gujarati Language (Communications)," Educational and Psychology, Vol.II, no.2, pp.54-55.
4. J.M.Ojha, loc. cit.,
5. ibid., and also in J.Prasad, "The Activities of Manovigyan, Shala, U.P., Allahabad," in S.D.Kapoor (ed.), Psychological Research in India, pp. 92-96.
6. C.M.Lindvall, Testing and Evaluation, p. 215.
7. L.J.Cronbach, Essentials of Psychological Testing, p. 157.

of intelligence advocated by the author of the tests. Thus, there was a vicious circle; intelligence tests were prepared on the basis of the theories about the structure and nature of intelligence, and the theory of intelligence in turn depended upon the findings of intelligence tests. This position continued for a long time, and perhaps disgusted by such state of affairs, Miles remarked: "Intelligence is, in other words, what the intelligence tests measure."[1] The result of all this was an enormous growth of mental tests as evident from the volumes of Mental Measurements Yearbooks[2] from one edition to another. The important developments, however, in the area of intelligence testing have been the following:

1. Group tests.-- The first World War necessitated the the testing of about one and a half million American recruits for the army; testing individually by existing individual tests was obviously out of question. Group tests were, therefore, devised. The first group tests were the well-known Army Alpha and Beta Examinations for literate (in English) and non-literate or non-English speaking recruits respectively. Like the first Binet tests, the Army Alpha Examination (and also Beta Examination) still continue to exist in their various revisions. "Although a variety of later tests have superseded

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1. quoted in Prayag Mehta, A Study of Intelligence of Rajasthani children of age groups 12-14 years reading in school grades VII and above, p.11.

2. O.K.Buros (ed.), (3rd, 4th and 5th) Mental Measurements Yearbooks.

Alpha for use in schools, many of the fundamental ideas found in it are still the basis for most modern tests."[1] A number of group tests were also devised in England to cater for the wartime needs but also continued their existence thereafter.

2. Method of Correlation:-- An important development was the technique of correlation, first realised by Galton, and w later worked up by Karl Pearson, but fully utilized by Spearman. He devised new and simple methods of computation of correlations. He, of all others, worked for a thorough analysis of the structure of the human mind. His work in two volumes entitled, "Abilities of man," is now deemed a classic. "His achievement, which is one of the most remarkable in the whole history of psychology, has given an entirely new significance to mental tests."[2] He, as is dealt with in a later section, founded the theory of factors, and paved the way for investigations into "structure" of intelligence as distinct from the "nature" of intelligence. This theory of factors stimulated, in due course, the development of the theory of aptitudes and aptitude testing. His formulation of the two-factor theory gave a new direction to the contemporary status of the theory of intelligence.

Simultaneous with this development in the field of testing, new theories about the nature of intelligence were enunciated.

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1. Lindvall, op. cit., p. 220.
2. Flugel, op. cit., p. 261.

Its exact nature, however, always eluded the psychologists, and there was "no unanimity among the psychologists about the meaning of the term."[1] It was, perhaps, this medley, which led Vernon to remark: "there are said to be as many definitions of intelligence as there are psychologists,"[2] and for Spearman, "intelligence is a word with so many meanings that finally it has none."[3] It was realised that exact definitions of intelligence were not possible, and yet, it was hoped, there was a possibility of its measurement just as "we do not yet know what electricity is, but we are so sure that it can be measured that we pay our electric-light bill without a protest."[4]

After consideration of the various theories and several tasks, solution of which involved intellectual exercise, psychologists attempted to explain intelligence in general terms, e.g. "an inborn, all round mental efficiency,"[5] "general adaptability to the new problems and conditions of life,"[6] or just as, "applied thought."[7] Ballard took into account various factors which affected the performance in a psychological test, and defined intelligence as, "the relative general efficiency of minds measured under similar conditions of knowledge, interest

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1. Mehta, op. cit., p. 8.
2. quoted in ibid., p. 9.
3. quoted in ibid.
4. P.B.Ballard, Group tests of Intelligence, pp. 141-142.
5. Burt quoted in ibid., p. 144.
6. Stern quoted in ibid., p. 136.
7. Adams quoted in ibid., p. 144.

and habituation."[1]

Freeman[2] has classified the main definitions into three types: those emphasising (1) adaptation of individual to his ~~to~~ total environment, ~~to~~ (2) ability to learn, and (3) ability to adapt. Some define it as the ability to carry on abstract thinking. Thorndike[3] divides intelligence into three types: Social, Concrete and abstract. Stoddard[4] has defined intelligence in more comprehensive terms. It reads as follows:

> "Intelligence is the ability to undertake activities that are characterised by (1) difficulty, (2) complexity, (3) abstractness, (4) economy, (5) adaptiveness to a goal, (6) social value, and (7) the emergence of the originals, and to maintain such activities under conditions that demand a concentration of energy and a resistance to emotional forces."

Wechsler[5] has offered another comprehensive definition, according to which the "intelligence is the aggregate or global capacity of the individual to act purposefully, to think relatively and to deal effectively with his environment."

English and English[6] also refer to the three concepts of (1) ability to deal with task involving abstractions, (2) ability to learn, and (3) ability to deal with new situations, which frequently are the conditions of intelligence.

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1. Ballard, op. cit., p. 145.
2. Freeman, op. cit., pp. 157-159.
3. ibid., p. 157.
4. quoted in ibid., p. 152. It would be interesting to compare this with the 'qualities' of intelligence, enumerated by the ancient Indian scholar, Kautilya, infra, p. 6.
5. quoted in ibid., p. 151.
6. H.B.English and A.C.English, A Comprehensive Dictionary of Psychological and Psycho-analytical Terms, p. 268.

Factor theory.-- As already referred in the preceding section, the Theory of Factors originated with the well-known two-factor theory of intelligence propounded by Spearman. For him, the intelligence was "eduction of correlates and relations." His theory envisages two factors - one general or 'g' which is more or less involved in all tests, and another specific or 's' which is peculiar to a specific test. Inasmuch as all activities which require intelligence are saturated with general factor in different degrees, a test measuring 'g', according to him, would be an appropriate intelligence test. He found these two factors from inter-correlation of several tests and by his method of finding tetrad differences. His theory, though much criticized, is still considered important and is regarded as an outstanding contribution.

The theory dominated the scene for a long time but gradually it was realised that it could not explain many mental processes involved in solution of a task. Thus, a man might be intelligent and yet would not perform well in some situations, or, vice versa, a person not intelligent enough would perform same job or skill very well. The theory of two-factor, therefore, needed to be modified and the theories of group or multiple factors came into vogue. The former, championed by Thurstone, assumed a group of abilities - collectively called a 'Primary' mental ability - which was supposed to be common to a specific mental operation. Thus, differnt 'groups' were involved in

different types of performances. Though his well-known Centroid method of factorization. Thurstone obtained six such 'primary factors'[1] which "emerged clearly enough for identification and use in test design and construction,"[2] though, they "do not include the entire range of human abilities."[3]

A variation of this theory is the Multiple-factor theory or the 'atomistic' theory of Thorndike. According to this theory there are several elements of mental ability, a combination of which is involved in any specific task-situation. Thus, there is no 'general intelligence' but "many highly specific acts."[4] There are different combinations of these elements for each specific performance and the degree of intercorrelation between two tests depend upon the common combination of these 'minute elements of ability.'[5]

The investigator would have some occasion later to refer to some tests, prepared on the basis of factor analysis. There was an enormous expansion of testing activity 'in the period between two World Wars.' This was stimulated by the development of improved statistical techniques and simplification of some processes already in vogue. This frenzy for preparation of tests and interpreting them in pure quantitative terms

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1. Thurstone's Test of Primary Mental Abilities are based upon such factorial analyses.
2. Freeman op. cit., p. 164.
3. footnote in ibid.,
4. ibid., p. 160.
5. this theory is the rationale of his SAVD tests for measuring a specific ability - ability to deal with abstractions.

provoked Sorokin[1] to speak of 'Testomania' and 'Quantophrenia.' The indiscriminate use of the statistical techniques and over-emphasis on the quantification of the test performances led to the counter-movement for proper evaluation of these methods. Vernon was probably quite serious when he remarked that the recent studies, "contain sufficient truth to demolish the psychometrician's contention that he can determine the essence of intelligence purely through statistical analyses of test scores."[2]

1.3 Aptitudes

Ancient times.-- As already referred in the earlier section, it was a recognised fact even in early societies that individuals differed in respect to their capacities, skills etc. In ancient India this knowledge was used for and cultiminated as in modern times, in a thorough placement of the individuals to jobs appropriate for the degree of skill one had. In his excellent treatise, Dasgupta,[3] devotes a full chapter to the topic of vocational psychology in ancient India. He has cited a large number of evidences to show that efforts were made toward an objective assessment of one's intelligence, skills and potentialities. It would not be out of place here to cite some of the instances and statements indicative of this.

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1. Pitirim A.Sorokin, Fads and Foibles in Modern Sociology.
2. Mehta, op. cit., pp. 33-34.
3. Dasgupta op. cit.,

As even now, the general measuring standard was the degree of general intelligence possessed by an individual. "The ancient Hindu savants...devised technique[1] ...and the educational programme of the educand was based on his levels of intelligence."[2] Dasgupta further says,

> "Our ancestors harnessed a completely consistent and sound systems of vocational psychology, in the service of arts from dawn of the Vedic civilization downwards...(and) the association of vocational psychology with art makes its appearance at the earliest phase of the Vedic civilization and there are repeated references to specific talents required for specific vocations in the Vedic texts.[3] Very naturally, each profession or occupation required special skill and technical knowledge and we get clear evidence of it in Rgveda."[4]

About vocational guidance, he cites a number of evidences and concludes that,

> "In hoary antiquity, during the time of the Mahabharatam...ability - general or specific, was the standard of occupational selection...The ancient Hindus applied the scientific method in directing the vocational selection of their children...The employers took special care in placing right candidates for the right type of jobs as to eliminate vocational misfits."[5]

In this he cites instances from Mahabharata and Agnipuranam. He also claims that,

> "...we can safely conclude that though sometimes parents decided vocational choice for their immature son, it was universal for the young adolescents to make a careful selection of life's occupation after a thorough survey of the entire range of curriculum."[6]

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1. however inadequate they may be from modern point of view.
2. Dasgupta, op. cit., p. 125.
3. ibid., p. 184.
4. ibid., p. 185.
5. ibid., p. 201.
6. ibid., pp. 204-5.

In this connection he cites the case of a young scholar, Jivaka, who chose his final vocation of medicine after going through all the available information of various trades and industries, open to him in those days. It is evident that this is very similar in principle to the modern concept of 'Occupational information' and 'Career Psychology.'

In Greece also, references of the need for proper vocational guidance may be found. This was a natural corollary from the fact of individual differences recognized since very early times. Anastasi quotes from the Republic of Plato which aimed at "assignment of individuals to the special task for which they were best suited."[1] According to her, "Plato proposed first systematically, described (military) aptitude test on record."[2]

As the first World War provided an occasion for the development of 'group tests', the second War provided an occasion to implement various findings, from the theory and factor analyses of intelligence tests, during the preceding period. The second World War to a considerable extent stimulated the development of the concept of aptitudes and their testing. "A great conflict again presented needs for methods of classifying men."[3] The theory of factors, especially of group factors was a forerunner of this important concept.

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1. Anastasi, op. cit., p. 24.
2. ibid., p. 3.
3. J.C.Nunnally, Tests and Measurements, p. 32.

The perennial problem of Heredity vs. Environment was also, to an appreciable extent, responsible for the thinking in this direction. It was recognised, for instance, that much of the so-called intelligence was not native but a result of interaction between Heredity and Environment and in many cases the environmental factors, were more prominent than the inborn and native intelligence. On this issue, several studies were made. In one study, Honzig and others showed that a prediction of adult I.Q. based on tests given at six years of age would be wrong to the extent of 20 I.Q. points for one in three children by the age of eighteen.[1] Pareek has surveyed various studies of this nature.[2]

This development, combined with the multiple factor theory and the necessity of finding out the best suited personnel for the War Services, 'from fighter pilots to cooks,'[3] stimulated the psychologists for the possibility of an inherent potentiality in a man to get trained in a specific job and to do it well. Thus, aptitude was distinguished from ability which refer to the present capacity or performance. Aptitude referred to the future performance, gained after necessary training. Given appropriate circumstances, Bingham, however, included aptitude under the general head of ability, though

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1. Flugel, op. cit., p. 309.
2. Udai Pareek, "The Case against Intelligence Testing," Education and Psychology, Mental Testing No., (1954:4-5), pp. 106-120.
3. Flugel, op. cit., p. 307.
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the present trend is to distinguish the two. Bingham wrote one of the first comprehensive definitions of intelligence for Warren's Dictionary,[1] which defines aptitude as an "ability to acquire with training some (usually specified) knowledge, skill or set of responses, such as the ability to speak a language, to produce music etc."[2] The training may be either formal or overt or just self imposed practice or indirected experience.[3]

The following are some of the typical definitions of aptitude:

> "Person's capacity or hypothetical potential for acquisition of certain more or less well defined pattern, of behaviour involved in the performance of a task with respect to which the individual has had little or no previous training."[4]

> "The capacity to acquire proficiency with a given amount of training, formal or informal."[5]

> " A combination of characteristics indicative of an individual's capacity to acquire (with training) some specific knowledge, skill, or set of organised responses, such as the ability to speak a language, to become a musician, to do mechanical work. An Aptitude Test, therefore, is one designed to measure a person's potential ability in an activity of a specialized kind and within a restricted range."[6]

> "A scientific definition of aptitude would provide for specificity, unitary composition and the facilitation

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1. A.G.Wesman, What is an Aptitude, pp. 1-2.
2. W.V.D.Bingham, Aptitudes and Aptitude Testing, p. 16.
3. ibid.,
4. C.W.Harris (ed.), Encyclopeadia of Educational Research, p. 59.
5. English and English, op. cit., p. 39.
6. Freeman, op. cit., p. 431.

of learning of some activity or type of activity and (also) is relatively constant."[1]

An inspection of these various definitions show a common agreement on the recognition of aptitude as a dovment potentiality, which can be harnessed by training. One of the simplest and the most descriptive statement in this connection is by A.G.Wesmann who says:

> "The total concept can perhaps be summarized by regarding aptitude as simply a capacity to learn. When we refer to stenographic aptitude, we mean the capacity to learn those skills which make for a successful stenographer...The measurement of aptitude then is the assessment of knowledge, skill and any other characteristics which serve to predict learning success."[2]

1.4 Summary

It was shown that the concept of individual differences was recognized from the earliest types, since the group life in human society began. References about these differences abound in several ancient Indian and Greek works.

In ancient India, the various philosophies and literary works presented a thorough analysis of the working of human mind and also described intelligence in very comprehensive terms. There was also probably an attempt to classify men with varying degrees of intellect and to assign them the jobs accordingly.

Though the roots of this probe into the realm of human

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1. D.E.Super and J.O.Crites, Appraising Vocational Fitness, pp. 71-72.
2. Wesman, op. cit., pp. 1-2.

intelligence, its differences and various sporadic attempts for its proper assessment, may be traced back to the earliest time of human activity, the interest in scientific explanation of these phenomena is of rather recent, and perhaps accidental, origin. The development of, andextension of the scientific methodology to, the sphere of psychology was in line with the scientific spirit which dominated the thinking in other spheres, specially in biology, physiology and medicine. In this context, contributions of Galton, Wundt and Spearman were referred.

The first scientifically prepared intelligence tests of Binet was followed by several attempts in this direction. The development of correlation techniques and factor theories contributed to this progress. The two World Wars also provided occasions for the large-scale application of these findings for an immediate purpose. The first War was instrumental in the development of group tests, while the second encouraged the growth of aptitude tests.