



Fig. II

Map of the world distinguishing parts in the following five stages of the demographic cycle :

- HIGH STATIONARY.** Data non-existent or very scanty : birth and death-rates both high—over forty per thousand, and approximately balancing each other, but with death-rates fluctuating more than birth-rates : China and Tibet. ? Afghanistan. ? Arabia. ? Persia. ? Abyssinia.
 - Asia*
 - Africa*
- EARLY EXPANDING.** Data often scanty and unreliable : birth-rates high—forty per thousand or over—and fairly stable—i.e. not steadily falling : death-rates consistently lower than birth-rates and tending to fall : Whole continent except countries numbered under 1, and Soviet Union and Japan which are in the late expanding phase.
 - Asia*
 - Africa*
- LATE EXPANDING.** Data sometimes unreliable : birth and death-rates falling, with death rates consistently lower : Whole continent except countries in the next two groups. Soviet Union and Japan. (The Asiatic parts of the Soviet Union are taken as a whole : if sub-divided, some would doubtless be placed in the early expanding stage.)
 - Europe*
 - Asia*
 - Africa*
 - Americas*
- LOW STATIONARY.** Data reliable : birth and death-rates both low : net reproduction-rates fluctuating about unity : Great Britain, Belgium, Germany, Switzerland, Austria, Hungary, Czechoslovakia, Denmark, Norway, Sweden, Latvia, Estonia, Finland.
 - Europe*
 - Americas*
 - Oceania*
- DECLINING.** Data reliable : birth-rates lower than death-rates :
 - Europe*

THE MEASUREMENT OF SOCIALLY VALUABLE QUALITIES

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TOWARDS the close of his life Galton wrote a book in which he described a eugenic Utopia, called Kantsaywhere. In this imaginary country "a system of competitive examination for girls, as well as for youths, had been so developed as to embrace every important quality of mind and body"; on the results of this examination depended the status of the individual, as well as the number of children which he would be permitted to raise. Reproductive functions were to be regulated by an oligarchy selected by tests; social status was decided by four tests which together took only four hours. Plato's republic, with the philosopher-kings selected by psychological tests—this is not an unfair description of Galton's Utopia.

Kantsaywhere was projected into a distant and visionary future when scientific methods of psychological assessment had not only been statistically validated, but also generally recognized and accepted. The present paper, written some thirty-five years after Galton's fantasy, may be regarded as a progress report; it attempts to answer the question—just how much nearer have we come to a state of knowledge which would make Galton's Utopia more than an attractive but utterly impracticable conception?

The answer to this question must be partly in an optimistic, partly in a pessimistic, vein. On the one hand, psychology has to record tremendous advances, both with respect to methodology and to factual knowledge. While the advances in knowledge have been made mainly in the field of intelligence testing, advances in methodology extend to the fields of temperament and character as well. We now know what are the important questions to ask, and what are the methods of investigation which will enable us to return the correct answer.

But on the other hand, certain debits must also be recorded. There has been a failure for psychology to become socially recognized, and in consequence of this failure there has been an almost absolute lack of public support. A mushrooming of pseudo-scientific, "intuitive," subjective, literary "depth" psychologies has succeeded in attracting the attention of a public eager for plausible "explanations" of its present ills, and unwilling to bear with the cautious, restrained and complex views of more scientific workers, phrased in terms of probability rather than of prophetic certainty.

Such public neglect has had certain inevitable consequences. The old view that good scientific work could be done in laboratories run on the "shoe-string and sealing-wax" principle might have been applicable fifty years ago in physical science, but in these days when shoe-string is rationed and sealing-wax is only sold under the counter the maxim loses much of its force. This is particularly true in the social sciences, which demand large-scale planning for the solution of any of the complex problems they may be asked to attack.

As an example of this necessity for large-scale research in the psychological field let us take the measurement of a set of relatively simple, straightforward abilities, viz. those involved in accurately aiming a bomb at a target. The selection of bomb-aimers was one of the tasks which psychologists were called upon to perform during the war, and they finally succeeded in this task beyond expectation. Yet the solution of even such a relatively simple problem involved the expenditure of millions of dollars, the participation of hundreds of psychologists, and the testing of hundreds of thousands of subjects. It is easy to see that the much more complex problems involved in the measurement of

“civic worth,” say, or of the severity of mental disorders, or in the inheritance of nervous stability, would involve large-scale organization of research in order to make successful solutions possible. Yet for every pound given to the physical sciences for research of one kind or another, the social sciences obtain a miserly few pennies, hedged round with restrictions, and devoted as often as not to severely practical problems of no fundamental importance. Under these conditions the promises held out by our advances in methodology may turn out to be only dead fruits in our hands.

What then are these advances in methodology? Ultimately they stem from the original inquiries of Galton, Pearson and Spearman, and relate to the solution of one of the most fundamental psychological problems in the field of personality measurement. The problem in question is that of the existence of psychological qualities. To the layman, whose mind is conditioned by the semantic training of mediæval “faculty” psychology, this question may appear nonsensical—of course, he will answer, there are qualities such as honesty, imagination, suggestibility, intelligence, memory, intuition, and so forth. To this assertion a powerful and influential school of psychology, composed of believers in the specific nature of conduct, has answered that “there are no broad, general traits of personality, no general and consistent forms of conduct which, if they existed, would make for consistency of behaviour and stability of personality, but only independent and specific stimulus-response bonds or habits.” In other words, a person may behave in an honest manner on one occasion, in a dishonest manner on another, depending on the specific nature of the situation in question; it is denied that there is any mythical quality of “honesty” or “dishonesty” which prompts his action.

This view, which grew out of the “transfer of training” experiments of William James, has much to be said for it. James, and many others after him, showed that the ancient belief that certain “faculties” of the mind, such as memory or logical aptitude, can be

trained by making the child learn by heart innumerable lines of Virgil, or by training him in the supposedly logical Latin language, is definitely false, and that training has results which are very specific. A child trained to learn by heart stanzas from Milton’s *Paradise Lost* would in all probability be better in the future at learning by heart more stanzas from *Paradise Lost*, or possibly even from *Paradise Regained*, but he would not improve in his ability to learn by heart Swinburne’s *Atalanta in Calydon*, or Grey’s *Elegy*, or Shelley’s *Prometheus Unbound*.

The extension of this belief in specificity of learning to the sphere of conduct was made by Thorndike, Watson and other behaviourists; it found an apparently complete proof in the investigations of the Character Education Enquiry. In this enquiry hundreds of tests were administered to thousands of school children, in which they were given the opportunity to lie, to cheat, to steal, to behave in a co-operative or a competitive fashion, to behave in various socially desirable or undesirable ways. The children were under the impression that their actions were not being observed, and consequently acted as if social sanctions for undesirable behaviour had been removed for the time being. In actual fact, of course, every detail of their activities was strictly controlled by extremely ingenious experimental procedures.

When the data of this enquiry were analysed, it was found that the correlations between different tests were very low on the average; in other words, the child who cheated in one type of situation showed very little tendency to cheat more than any other child in a second or third type; the child who told the truth in one set of circumstances was almost as likely to cheat, or to steal, as the child who told a lie. In other words, behaviour was shown to be specific to an extraordinary extent.

This conclusion has been criticized on two main grounds. In the first place, it has been suggested that the traits studied were wrongly chosen; that honesty is an ethical and a social, not a psychological, concept, and that therefore the conclusions arrived at

on a basis of analysing honest and dishonest behaviour may have no relevance to more psychological types of variables. In the second place, it has been pointed out that traits such as honesty are presumably acquired through social learning, and that such learning has not had much time to take place, and to create a firmly integrated type of character, in a young child; conclusions based on young children may not be true for adults. Experiments have shown that indeed for adults correlations are very much higher than for children, and that for them at least the doctrine of specificity only applies to a relatively small degree.

These results appeared to favour the school of "generality," i.e. those who believe in the existence and importance of those broad, general traits of personality which the "specificity" school deny. Theories of generality have in the main taken two forms—that of "type" psychology on the Continent, and that of "trait" psychology in the U.S.A. The differences between these two ways of systematizing one's thinking about common or general factors in behaviour have been much over-stressed in polemical writing; they are of no great practical importance.

The outcome of this great battle between "specificity" and "generality" has been, as so often in scientific matters, a recognition that both schools were right in what they asserted, and wrong in what they denied; human conduct is both specific and general. Our acts are determined both by broad, general traits of personality, and by the specific features of any particular situation; our problem is to find out (*a*) what are the proportions in which specific and general elements are active in any particular situation (test), and (*b*) what precisely are the general factors we have to deal with, and how can they be measured. Both these tasks can be accomplished by the use of a statistical technique called "factor analysis," and various subsidiary developments of this technique, such as analysis of variance, for instance.

It is impossible in the compass of this paper to describe in detail the nature of these

techniques, but it is perhaps not too inaccurate to say that factor analysis attempts to argue from the pattern of relations found between a number of tests to the underlying causes which may have been instrumental in originating a pattern of such a kind. It is thus firmly based on John Stuart Mill's law of "concomitant variation," deducing causal relations (though not necessarily direct and obvious ones) from significant co-variations of different tests. Put very simply, the factor analyst argues that when he finds that a number of tests all using verbal problems correlate very highly together, while another group of tests all using non-verbal material of the perceptual type also correlate highly together, and that these two groups of tests are themselves correlated to a significant but rather lower degree, then it appears likely that all the tests concerned involve a rather general type of mental ability, and that in addition the verbal group requires a more specific "verbal" ability, while the non-verbal group of tests requires a visuo-spatial type of ability.

In the intellectual field several such factors, covering certain areas of considerable breadth, have been discovered in addition to Spearman's general factor of intelligence, called "g." The pioneer work in connection with these less broad, but equally important, so-called "group factors" or "primary abilities" was done by Sir Cyril Burt; confirmation has recently come from American workers like Thurstone and Holzinger. Thus there appears general agreement that there are broad abilities making for proficiency in dealing with spatial relations, perceptual speed, verbal relations, attentive processes, word fluency, numerical relations, mechanical or practical problems, æsthetic judgments, and so forth. The isolation of these qualities, which are undoubtedly "socially valuable," is one of the proudest achievements of modern psychology.

When it comes to the application of factorial methods to non-intellectual problems, we find a much less developed state of affairs. Here again, Spearman and Burt were the first to give a broad survey of the field; Webb, one of Spearman's students, Burt, in

a paper written at the time of the first World War, and Garnett, in a re-analysis of Webb's data, showed that we may reasonably regard the non-cognitive field as structured around two main independent axes, factors, or general qualities. First, we have a scale of integration, leading from the highly stable person, through the ordinary, run-of-the-mill type of person, to the highly unstable, neurotic patient in the mental hospital. Secondly, we have a scale of extraversion-introversion, also leading from one extreme, through an intermediate belt of relatively ambiverted persons, to the other extreme. Thus the rôle which Spearman's "g" plays in the cognitive sphere is played by the general factor of "neuroticism" in the conative, and by the general factor of "extraversion-introversion" in the affective field (Eysenck, 1947). It is likely that other broad general factors may still remain to be discovered, and indeed in a recent book entitled *The Description and Measurement of Personality*, R. B. Cattell (1946), has shown good reason to believe that about a dozen altogether have already been identified with sufficient accuracy to permit of attempts at measurement.

With respect to measurement, it may be said that here we have reached a stage rather less advanced than that of the intelligence tester. While in the field of personality integration and extraversion-introversion we are still in the strictly empirical sphere, intelligence testing has succeeded in elaborating principles (e.g. Spearman's neo-genetic principles) which permit of more rational methods of test-construction. At the moment we can measure such a factor as personality integration with relatively high accuracy; however, our tests are not based on any fundamental, rational, underlying principle, but are merely of an empirical kind, i.e. they are tests which have been found in trial-and-error practice to give discriminative results.

This trial-and-error method follows rather closely the validation methods of the intelligence tester. Just as he starts out with a group of children of known dullness, and compares them with a group who are known

to be bright, throwing out all those tests which do not differentiate adequately between the two groups, so in the field of temperament and character also the experimenter starts out with groups of known neurotics and known "stable" persons, say, trying out tests which to him appear likely to differentiate between the two groups. Successful tests are retained and improved; other tests are discarded. In this fashion it is possible to build up a battery which in efficiency of diagnosis is hardly inferior to intelligence tests. Similar considerations apply also to the measurement of introversion-extraversion.

The writer (1947) has given detailed accounts of the more usual tests which are used in this connection in his book *Dimensions of Personality*.

Unfortunately they cannot be described in brief, but reference to just a few of them may make clear the rationale on which they are built. Thus psychiatrists tell us that neurotics, particularly hysterics, lack persistence in pursuing their aims, and are easily diverted from the steady work required to reach these aims. A miniature situation is therefore created in the laboratory in which the subject may or may not show persistence when diverted from the pursuit of some arbitrary task by fatigue, boredom, or positive counter-attractions. To take but one instance, the task may be that of "word building," in which the subject is given a number of letters and has to build up as many words as he can from these disjointed letters. No time limit is set, and it is found that while the non-persistent hysteric gives up after a few minutes, the persistent person may go on for a very long time indeed.

Or again, it is often said that neurotics are more suggestible than normal persons, and consequently the psychologist may devise a miniature situation requiring the subject to react in some way to a frequently repeated suggestion. Thus the suggestion may be that the subject is falling forward; although he tries to stand still and erect the neurotic is found to be incapable of resisting this simple suggestion, and in quite a high proportion of cases actually falls forward, or at least sways

violently. The normal person usually has little difficulty in resisting the suggestion.

Other types of tests involve the measurement of the reaction of different subjects to experiences of success and failure, or the measurement of the neurological concomitants of emotional excitement. Others again rely on the tendencies of individuals to "project" their own desires, wishes, and problems on to others; the subject on being presented with a picture showing some rather indefinite situation involving a man and a woman is likely to invent a story based to some extent on his own personal experiences and difficulties when asked just what he thinks is happening to the people in the picture.

While we can thus measure our main personality factors, we know little about their genesis, their distribution in the population, their connection with age, sex, social status, birth order, and so forth. Indeed, it is probably one of the main research tasks which face us here: to make use of the newly acquired methods of measuring personality variables, and conduct crucial and fundamental experiments into the factors which determine the position of a given individual on these trait-continua. The methods for carrying out this research are at hand; given the requisite social support there is little doubt that within a few years psych-

ology will have succeeded in giving at least a preliminary answer to these burning questions—questions fundamental to psychiatry, sociology, and indeed all the social sciences.

This, then, is the conclusion of our progress report; psychology has made astonishing progress in the few years since Galton wrote. It has shown that the slogan under which it began its career—"Everything that exists, exists in some quantity, and can therefore be measured"—applies equally to the mental as to the physical world, equally to the field of character and temperament as to that of intelligence. These advances may rightly give us grounds for satisfaction; at the same time they must not blind us to the enormous complexities and the terrifying extent of the field still to be investigated. The methods for solving these problems are fairly well understood, and their spheres of usefulness known; it is up to society to use them, and to help psychology to advance to a state where Galton's vision will not appear a remote prophetic dream, but merely a statement of the obvious!

REFERENCES

- Cattell, R. B. (1946). *The Description and Measurement of Personality*. New York: World Book Co.
- Eysenck, H. J. (1947). *Dimensions of Personality*. London: Kegan Paul.

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