human nature as an earnest search for the units of material and force which are the indivisible factors in the structure. Given units, the engineer can analyze, measure, synthesize and adapt. If we can first find or make some approximation to any units in human nature we shall have taken a long step toward bringing about the aims of psychology and of scientific management.

Psychologists are pretty generally agreed that the three emotions observable in earliest infancy are basic and unresolvable into simpler factors. In other words they are actually units within our present meaning. These have been termed fear, anger and love, although in our employment vocabulary we shall want to use somewhat milder designations, such as caution and fighting spirit, for example. Later on other types or categories of behavior appear which seem, at least for our practical purposes, to be also unresolvable into simpler forms.

As personal characteristics we may refer to them merely as "units" in the personality. But personality can only be analyzed and measured through an appraisal of behavior or response. In action, therefore, we refer to these "units" as categories of behavior, or simply as unit or basic categories.

There also become evident in our examination certain aptitudes which are essentially intellectual in nature; such as numerical ability; certain special aptitudes, such as the mechanical group; and certain physical aptitudes, such as quick reaction times and various types of dexterity. These latter are pertinent to the subject of employment, but they are mostly appraisable successfully by psychological tests and will not be elaborated upon in this study of personality.

Then there are terms like "initiative" which has been treated elsewhere[5] and shown to be decidedly complex in its nature. In general the criterion assumed for a "unit" or basic term or category is that in common business and industrial parlance it cannot be expressed in two or more simpler terms or categories.

However, as opinions may differ and as psychological theories may be at variance with industrial usage, the logical course is to add to the original three an assumed set of basic categories which appear to be in accordance with common sense and practical experience, and then to try them out. If a large amount of vocational and personal behavior can be adequately expressed in these fewer and simpler terms, we have the first pragmatic evidence of a useful set of the engineer's "units of material and force."

The next step is to develop methods of appraisal of each of these in a given individual. Here his past behavior is the key to his future behavior and it becomes necessary to present typical situations which will bring out as nearly as possible the average strength of his responses within the given category. This is done in the present technique by means of a questionnaire, as explained later. If statistical procedure gives further evidence of the appropriateness of the units and the questions we may take it as a working hypothesis that we are on the right track.

Psychologists have for some time been earnestly attacking the problem of measuring occupational preferences, mental attitudes, personal tastes, various likes and dislikes and volitional tendencies. Although the reliability of the results has been admittedly rather low thus far, useful and valuable data and methods have been obtained. This technique is an attempt at a further contribution directly applicable to industry's needs.

Reverting to our proposed list of units, the first was caution, fear being merely the extreme expression. Whether a man has much, average or little caution often makes a great difference in his aptitudes for a particular job and his success in it. Nature has endowed most people with at least a minimum of caution as a means of achieving self-preservation for the individual and therefore for the race. But a man who was excessively timid would never be happy as a boss in a powder mill, and a person who was extremely reckless would hardly make a good captain for an ocean liner. Caution has its place, but unfortunately it is at best rather a negative quality. However, it obviously works in conjunction with many other human feelings to produce a varied assortment of useful attitudes and actions.

Anger, the second on the list, is of course the extreme expression of fighting spirit. The combative instinct is present in a greater or less degree in all of us. When this rises to real heights, due perhaps to the encroachment of someone else, there may be an explosion. If there is not, it is a tribute to our self-control—or perhaps even to our caution—more than an evidence that we are not really angry.

[5]Hull, E. Hayden, "Management Psychology a Joint Responsibility," *Bulletin of the Taylor Society*, Vol. XIII, No. 2, April, 1928, p. 95.

Fighting spirit, contrary to the situation regarding caution, is one of the great dynamic forces in constructive industrial and business success. There are even occasions when it pays to get angry and show it. Granted that this is rare, a greater or less degree of fighting spirit itself is usually a distinct factor in a highly successful executive career and in many forms of dynamic accomplishment. But the proportion must be suitable to the job in view. The president of a corporation in a highly competitive line needs a generous portion, while the head of a minor clerical department may well have rather less than average.

The province of the third elemental impulse, love, we shall not invade in this paper.

Having considered all the unimpeachable information as to which human emotions are really basic, we shall have to follow some other course to increase, at least tentatively, our list of units in human engineering. There are hundreds of variables in human nature. Some, in addition to the original three, are presumably elementary.

It would seem reasonable to suppose that the common judgment of centuries on human nature might have some authentic value. This judgment is expressed in our language itself. Various manifestations of human nature—or forms of behavior, or types of response, if you prefer—have been given names which have come to be generally understood and used as designating particular categories of human expression. Thus, when we say that a man is habitually "cautious," we are in effect saying that in his normal range of action he exhibits the particular manifestations of caution which the situation calls for, and in a degree which is habitually greater than the "average" man would show. But the differences are only in degree or mode of expression of the same fundamental or "unit" quality in human nature. Common usage has arrived at no simpler or more basic category, and in this case the conclusion has been verified by modern scientific investigation.

Similarly we say, with reference to intellectual or special abilities, that a man is "good at figures" or has a "very analytical mind," or "unusual mechanical ingenuity" because our experience with him has shown us that he is above the average in these respects. In these latter cases we have already developed, by scientific investigation and statistical method, means of telling just how high he rates as compared with the general population. There seems to be no reason for treating fundamental characteristics of personality any differently. It should be possible to measure the amount of each, at least approximately, and to predict probable future behavior under appropriate circumstances. If this be true we can get data with a wide variety of usefulness.

A list of presumable "unit" or basic terms which have been found practically useful in expressing and evaluating a wide variety of personal characteristics, and which have some statistical confirmation as to their validity is shown in the first column of Figure 1. The words in parenthesis are explanatory, or more or less synonymous, and have been added to illuminate the connotations of the term. Further explanation will occur in the context.

It is rather difficult to express any of these terms in two or more simpler terms. Some of them have one word to express the inner feeling and another, or others, to designate typical outward expression, but these seem to be co-ordinate expressions of the same integer, not two or more component parts. Thus, the basic undifferentiated inner feeling corresponding to self-reliance is probably self-esteem. The man who does not think much of himself can hardly exhibit much self-reliance. We prefer in general to use the term self-reliance because it can more readily be expressed in terms of objective behavior. On the other hand for purposes of analyzing compound characteristics into their unit factors, the term expressive of the inner feeling is sometimes from the very nature of the problem more descriptive. In many cases usage applies the same term to both the feeling and its generic mode of expression.

The welter of words which is avoided by the use of a basic term is illustrated in Figure 2. Here three degrees of power in each of three general situations are listed, with a special term appropriate to each, though all are based on the single unit term. The latter term is all that should be necessary. If the employer knows whether the man is habitually high, low or medium in this he can apply the information to the job situations much more rapidly, and probably much more accurately,