

REFLECTIONS ON THE ABILITY DIMENSION
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The supply of mental ability is important in many ways to human welfare and happiness, in the near future and the long run. Contrary to traditional beliefs, the present limits of ability in our society are not set by genetic factors, but to an important extent by sociological conditions, which support a sort of "collective ability." The prospects for an early important increase in the collective ability in the United States are favorable. Some of this will follow automatically if present economic and educational trends continue. Some depends on the acceptance of responsibility by sociology for systematic research in the field of social causation of high ability.

THE survival and welfare of every person on earth rests on organization. In simple organizations, as in prehistoric societies, only small populations can exist. Our immense contemporary civilization survives luxuriously only by virtue of a base of elaborate organization.

More extensive organizations can support more population at high standards of living. As Ogburn has shown, among modern nations differences in living standards are related not so much to inequality of resources as to differences in complexity of organization.¹

We cannot have intricate systems without a supply of high and conspicuous ability in the population. Scarcity of abilities is palpably a major and conspicuous obstacle to progress in some of the currently developing nations.²

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¹ William F. Ogburn, "Population, Private Ownership, Technology, and the Standard of Living," *American Journal of Sociology*, 56 (January, 1951), pp. 314-319.

² Brazil, for example, has immense wealth of resources, in arable land, hydro-electric potential, forest, fish, rubber, iron, bauxite, and probably oil. Sixty-seven million persons inhabit the coun-

try, but half are barefoot, undernourished, and illiterate. Two-thirds of the children get no schooling. *Time*, June 30, 1961.

It also appears that, in our own economy, the supply of ability is a factor in its potential growth rate. The present concern about automation bears on the point. Assuming that we do not elect to arrest further automation, the solution to technological unemployment must lie in the stimulation of a marked increase in the growth rate of the Gross National Product, and this in turn obviously requires an augmented supply of the various kinds of ability involved in inventing and organizing. There will have to be new products if we are to employ the persons no longer needed on farms and unskilled laboring jobs. These new devices will have to be developed at a greater rate than the already high pace of invention.

The current tempo, which we must outrun, is illustrated by the observation that eighty per cent of the sales of the Radio Corporation of America are of products unknown a little over a decade ago, and by a recent forecast of the Du Pont Company that at least 60 per cent of its 1975 sales revenue will be from products now in their introductory

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stages or still to be invented. It has also been predicted that within the next three years, in the transportation industry, almost 30 per cent of its sales dollar will come from products either new or so changed as to be considered new. Chemical research, an immensely important component of all inventive activity, measured by published volume, has doubled from 1950 to 1960. While these selected examples may over-represent the present pace of technical innovation, they give a useful impression that the needed acceleration is from an already swift-moving rate of development.

Present population trends do not give a prospect of an early automatic increase in the proportion of productive persons, for the U.S. population is now bulging at the young and old ages. We will have 16 per cent more population in the United States by the end of the present decade, but only a three per cent increase in the most creative ages of 25-44. This fact clearly intensifies the urgency of artificial stimulation of capacities in the part of the population that must bear the mental burdens.

It does not suffice to have a limited stock of geniuses at the top of the productive organization. The need is equally great for a wide distribution, throughout the society, of personal characteristics favorable to the operation of elaborate technology and organization. While mankind has always correctly sought for able leaders, we have chronically over-emphasized the importance of a few great men in the growth of civilization, and have failed to appreciate the importance of distributed ability. Advanced achievements, we now realize, rest not only on the shoulders of generals, statesmen, and inventors, but importantly on the skills, muscles, and morale of the common soldier, the curiosity and optimism of minor technicians, and also the inconspicuous crevice processes of custom and law-building which underlie all governmental structure.

Elaborate technology is not alone capable of upholding a civilization. It fails without a wise distribution of machine skills. The ingenious products of the inventor's mind must be continually maintained, improved, repaired, and properly used. The pre-industrial peasant who has never known gasoline engines may acquire a tractor and learn to

drive it, but unless he has also a supply of generalized comprehension of such matters as the effects of overheating, the necessity of lubrication, the function of spark plugs, he will not long till his fields by machinery.

Deficiency of technical ability contributes to the fact that in 1961 the unemployment rate is highest among the unskilled and uneducated workers. Many of these workers, at their present levels of ability, are not qualified for the new jobs created by technical advance. Simple retraining for more skilled tasks will not suffice, for recent studies have revealed a lack of general aptitude in the majority of those with long-term unemployment. Many are in fact on the edge of illiteracy, and their deficiencies are in important part matters of basic schooling.

Ogburn's conception of the three factors determining the rate of invention, proposed a third of a century ago in his notable book *Social Change*, still appears to be sound. These factors are (a) a supply of inventive ability, (b) a demand for inventions, and (c) the existing body of knowledge, which he called the cultural base. Ogburn argued that the influence of the first two is less crucial to the rate of inventive progress than that of the third, holding that large populations generally have an adequate supply of individuals of high potential mental ability and that the need factor fails at crucial times, as in the case of the Black Death, and makes no contribution at all to ingenious but unneeded devices, such as hula hoops.

The most significant element in Ogburn's theory is the statement of the way in which the accumulated store of knowledge, the cultural base, becomes almost self-nourishing. When all of the elements needed for a flying machine were present, the steps of making the final working combination were so small and so obvious that they were taken independently by more than one inventor. We know, therefore, that had the Wright brothers died in childhood we would still have had airplanes, and at about the same time.

Our hero-admiring habits have beguiled us into overlooking the significance of the thousands of contributors to the development of every complex machine in favor of the person who made the small step in the middle of the stage that marked the transition from a merely promising device to a

functioning but unperfected machine. The jet monster we ride in today is a product of the combined thought of great numbers of uncelebrated innovators, many probably equal in mental capability to the Wright brothers. The point applies also to more commonplace products—a nylon garment, for example, is based on a long series of chemical discoveries, and on an unmeasured amount of anonymous ingenuity involved in the design of the machines that extrude filaments and stretch them into fibers, dye and spin the threads, and fabricate them into serviceable garments. The important brain power responsible for all this is not a possession of a few giants, but is a funded mental wealth which is a characteristic of any civilized population, but is lacking in varying degrees in less developed societies.

The above argument suggests a concept of *collective ability*, denoting the supply and organization within a society of all the relevant abilities which give the society its creativeness and power. This *collective ability* is not only a matter of technical knowledge, but also of general comprehension of social wisdom, as well as of popular aspiration toward excellence in a variety of fields of mental activity. A high level of collective ability produces not only science and machinery, but also efficient organizational behavior; this in turn allows effective complex governmental, economic, and social organization.³ Responsibility for research in this superorganic form of creative potential must of course be accepted by the science of sociology.

The relative security and power of advanced nations thus lie not in buried gold but mainly in the accumulated capital of collective ability. The statement also applies to the great world society, and to subdivisions within nations. Thus our best defense against discouragement in our flooding tide of troubles would be an acceleration in the development of our collective mental

power. This, of course, does not automatically produce a stable Utopia; new problems will erupt forever. To handle them we will need ever further exponential growth of collective ability.

Not long ago the prospect of such a growth seemed hopeless, for ability was generally held to be fixed in biological inheritance, and improvable, if at all, only by a glacially slow and impractical eugenics program. The present argument, however, is that, in a literal sense, and to an important degree, a society generates its level of ability, and further, that the upper limit is unknown and distant, and best of all, that the processes of generation of ability are potentially subject to intentional control.

The foregoing statement is not a new thought. It was familiar to some prominent Nineteenth Century European scholars. But a half-century or so ago a miniature Dark Age descended over the field of human psychology and the doctrines of the mental testers convinced an impressed public with a secular variant of an infant damnation doctrine.

A single illustration is here offered to symbolize the whole movement. The able and distinguished psychologist, Carl E. Seashore, spent much of his research career investigating musical ability, which he analyzed into a few measured elements. Among the most basic of these, he believed, was the ability to discriminate accurately small differences in musical pitch. He held as follows:⁴

[Pitch discrimination is] an immediate impression . . . dependent upon the presence or absence in various degrees of the sensitive mechanism in the inner ear. . . . A good test in the hands of an expert may properly establish the physiological limit of pitch discrimination. . . . The physiological limit for hearing pitch does not improve with training. . . . What a blessing to a girl of the age of eight if the music teacher would examine her, and, if necessary say, "much as I regret it, I must say that you would find music dull and difficult, and I would advise you to take up some other art."

This is, of course, to say that either the ability was there or not, and if not, nothing could be done about it. This view was and

³ Recent studies show that there is a high relation between level of education and tendency to join voluntary associations. See, for example, Charles R. Wright and Herbert H. Hyman, "Voluntary Association Memberships of American Adults: Evidence from National Sample Surveys," *American Sociological Review*, 23 (June, 1958), pp. 284-294.

⁴ Ruth F. Wyatt, "Improvability of Pitch Discrimination," *Psychological Monographs*, 58 (1945), passim.

still is widely held by educators and the public.

Seashore's conviction was strengthened by the fact that he had made unsuccessful efforts to train persons to improve pitch discrimination. The trouble turned out to be that he apparently did not know how to apply such training—possibly his heart was not in the task. Eventually, however, training did succeed in reversing Seashore's results and the concept of that particular type of fixed innate ability was flatly overthrown.⁵

The same delayed revolution has been, and is now, going on in the field of abilities in general. We no longer heed the doctrinaire testers who pronounce specific individual limits for potentialities in mechanical ability, language ability, artistic ability, and mathematical ability. Their ceilings have all been discovered to be penetrable. Slow readers are being retrained. The linguistic near-imbecility of college students is treated by new teaching methods and motivational stimulation. Barriers in many fields of knowledge are falling before the new optimism, which holds that anybody can learn anything.⁶

In sum, we have turned away from the concept of human ability as something fixed in the physiological structure, to that of a flexible and versatile mechanism subject to great improvement. Upper physiological limits of performance may eventually be shown to exist, but it seems certain that these are seldom if ever reached in any person, and in most of the population the levels of performance actually reached have virtually no relation to innate capacities.⁷

⁵ *Ibid.*, pp. 51–53. Wyatt used a stroboscope which permitted subjects to see which of two sounds had the higher pitch. The subjects were trained in twelve 50-minute sessions, and all improved. The group as a whole gained more than a third of the maximum possible.

⁶ See Jerome S. Bruner, *The Process of Education*. Cambridge: Harvard University Press, 1961. Bruner holds that "any subject can be taught effectively in some intellectually honest form to any child at any stage of development."

⁷ If it appears illogical to claim that physiological differences exist, but do not produce differences in performance, consider the rates of speed of automobiles on crowded metropolitan streets. The vehicles differ in horsepower, and in observed speeds, but the speeds may depend entirely on factors other than horsepower—openness of the way ahead, urgency of the trip, nerves of the driver, and dis-

Thus the amount of ability in each person is created in the course of experience, and the supply of ability in any society is at present a consequence mainly of impersonal social processes rather than of intentional control.⁸

Any society tends automatically to reproduce its level of achieved ability among its members. The most obvious factor in this continuity is the richness of the social heritage. As we learn in our first course in sociology, a preliterate society can have a culture only as complex as can be carried in the minds of the living generation. With the acquisition of writing this limit is removed, and civilization of unlimited complexity is made possible. The fund of knowledge stored in print and accessible to the population is a major component of the framework of collective ability.

Another variable of obvious importance is the breadth of distribution of advanced knowledge within a population. It makes a difference whether the advanced knowledge is possessed only by a small minority or distributed widely in a population by formal education. Institutionalized schooling, viewed variously as having the purposes of child-tending, job-qualifying, and mate-finding, is above all a potent instrument for raising the ability level of the population. This is done at the lower grades by transmitting important basic aspects of the general heritage, and in the higher levels by developing versatile capacity to face novel problems. Graduate schools in the various fields of science concentrate on this latter capacity by training students for independent and original research, and, to the extent that they succeed in their principal function, constantly and exponentially add to the supply of the most generative type of human ability in the population.

position of back-seat passengers. On a road race, of course, the factor of horsepower could become the principal determiner of speed.

⁸ In the case of mental calculators, and perhaps some other prodigious performers, the processes are unsystematic and accidental. A number of calculating prodigies developed their ability as a consequence of circumstances that required frequent counting, and an abundance of solitude. See R. E. L. Faris, "Sociological Causes of Genius," *American Sociological Review*, 5 (October, 1940), pp. 689–699.

Aware as we all are of the educational boom in the United States, we may still overlook its spectacular implications for the future. What is happening at the present time is that the nation is quietly lifting itself by its bootstraps to an importantly higher level of general ability—an achievement which, though less dramatic than a space voyage to the moon and less measurable than the Gross National Product, may mean more to the national future than either.

A few statistical items may help us to assess the extent and possible consequences of the contemporary educational surge. It was only forty years ago, according to the U. S. Census, that less than 27 per cent of the age group 25–35 completed a high school education or more. The percentage reached 58 in 1950, over 70 in 1960, and is expected to exceed 78 by 1970. College enrollment is of course rising to a similar flood level. A little over 30 years ago the undergraduate enrollment of the United States population ages 18 to 21 was 21 per cent. In 1961, it is over 30 per cent. If intentions could be accepted as reliable for forecasting they would indicate a 1970 percentage at least twice as large.⁹

Graduate school enrollments in the same period have increased from about 200,000 to 330,000, and the prediction for 1970 is 560,000—thus approaching the tripling of the most important source of advanced research ability in only twenty years. Most of this is a net gain in educational achievement, for the majority of the fathers of contemporary graduate students, 62 per cent, never even attended college, and only 13 per cent of the fathers ever had any graduate study. No comparable quantitative expansion in formal education has occurred in all history. Any qualitative improvements, of course, add further to the effects of these trends.

The consequences of such an educational prosperity to the pace of basic research and, therefore, our ability to meet new perils are incalculably great. Our present accomplishments in science arise from the activities of a relatively limited number of trained per-

sons. An estimate by the National Science Foundation indicates that academic research manpower today is not large for a nation of 180 million. In 1953 the full-time equivalent number of faculty members engaged in research was only 16,500. Incidentally, of these only 1,700 were in psychology and the social sciences, which may help to explain why our nation has more success in handling technical problems than human affairs.

It has been estimated that the United States Ph.D. output in all fields of knowledge will nearly double in the decade 1960–70. Any such increase, if maintained, will automatically continue to add to the ability level of the population as the highly trained generation advances through the age levels and replaces the older and less-educated people—thus the force of the present increase alone may not be fully experienced until forty years have passed. Allowing for various uncertainties in all the above statistics, all signs point to a half century of immensely fruitful development in the national supply of formally educated people.

Formal education, for all its importance, is not the only producer of talent in the population. We have abundant reason to recognize the importance of other contributing influences which are less conspicuous and controlled.

Among the most effective of these is the informal influence of the family on the intelligence of children. We have long recognized a relation between abilities of father and son, but here again too much credit has traditionally been given to heredity. Sociologists have had reason to become aware of the fact that mind itself arises in a social process, and this knowledge should suggest a search for intellectual differences resulting from varying qualities of influence from parent to child.

There is now a large and growing body of convincing research which indicates that a factor of central importance in this family transmission of ability is size of vocabulary. Children normally acquire their speech initially within the family, and in harmonious families the degree of richness in parental language becomes a major determiner of the quality and quantity of the child's vocabulary during his growing years. We know that intelligence tests and school success are heavily influenced by verbal facility, and it

⁹ In April, 1961 a national sample of parents of children of precollege age was asked by the American Institute of Public Opinion if they thought their children would go to college. Seventy-one per cent of parents replied yes, and only 16 per cent no.

must follow that the size and precision of the vocabulary used by parents before their children would be a major factor in achieved and measured intelligence.

Size of parental vocabulary is not the whole story, however, and we may be sure that research directed toward subtle influences within the family will yield applicable knowledge. Among the promising objects of such study we may list: the degree of richness and warmth of relation between parents and children, variations in clarity and orderliness of communication, amount of encouragement of the child to take initiative in talking and relating experience, the development of early familiarity and ease with handling quantities and measurements, acquisition of advanced motivation for reading and school learning, the creation of a broad appetite for orientation to the world and a hunger for knowledge of all kinds, a delight in novel thoughts, and the development of a sense of confidence that answers to questions are not hard to find.¹⁰ We may also look within family processes to find how it comes about that some children gain a self concept of a person who expects to be able to do whatever he decides to undertake.

Another research lead of promise is in the field of sources and effects of aspiration. We have much reason to believe that aspiration is a controlling variable of importance within family, peer groups, communities, and other social groupings, and that these groups may affect intelligence upward or downward through supplying or limiting aspiration among its members.

Among the well-known institutionalized obstructions to learning is the informal complex of attitudes long embedded in the special culture of school children. This attitude complex may be the major explanation of

the notorious inefficiency of the instructional process in the schools. Experiments of many kinds have abundantly shown that children can learn far more efficiently, and can handle much more complex materials, than they actually do in the schools. There is a minor scandal and mystery in the fact that a child can spend three years in school study of a foreign language and know little of it, while the same child placed in a school abroad may acquire speaking ability within a few months.

A part of the explanation of the disappointing product of the schools thus must lie in the existence among school children of an informal culture, that constitutes a destructive influence on aspiration for learning. In general, our schools are burdened by an ancient pupil tradition which defines lessons and study as unpleasant and also as unimportant to the life the children see about them. Probably most children acquire this concept in the first or second grade and never lose it completely even through the college years.

In general, the assurances of teachers that mathematics, languages, history, and science will be of interest and importance in the student's future life is successfully opposed by the child's experience in athletics, activities, and social intercourse. Coleman has recently described the operation of informal prestige systems in a group of public high schools, and has shown how these systems direct energy and aspiration away from scholarship.¹¹ In each of the schools studied the students who were accepted as members of the "leading crowd" held attitudes involving less emphasis on scholarship than those held by the consensus of all students, and in most schools the leaders differed from the other students in the direction of even greater emphasis on athletics. In each school, athletics appeared to be more influential than scholarship—that is, most students stated that they would generally prefer to be remembered as athletic stars than as brilliant scholars. Of course all this has long been known, and since the days of Woodrow Wilson at Princeton has been a matter of much concern to educators. Our formal educational

¹⁰ The present discussion obviously concerns not only the type of intelligence measured by IQ, but whatever mental capacities have value for human purposes. Current research, for example, succeeds in drawing a distinction between a high IQ and a certain type of creativity which would appear to be related to inventiveness. See Jacob W. Getzels and Philip W. Jackson, "Family Environment and Cognitive Style: A Study of the Sources of Highly Intelligent and of Highly Creative Adolescents," *American Sociological Review*, 26 (June, 1961), pp. 351-359.

¹¹ James S. Coleman, "The Adolescent Subculture and Academic Achievement," *American Journal of Sociology*, 55 (January, 1960), pp. 337-347.

system, powerful as it is, operates against a heavy braking effect from an informally organized aspect of juvenile society.

The above is only one among various ways in which our society and culture inhibit abilities. Research has shown that one of the most direct of these influences operates through the control of aspiration by the primary groups of school-age children and youth. Abundant evidence supports the principle that primary groups tend to form on the basis of homogeneity in almost every respect observed—age, sex, socio-economic status, activity interests, and intellectual qualities. Furthermore, once established, these primary groups exert pressure on their members to maintain their similarities. This force operates to hold the achievement and aspiration level toward the approved mode for the group.¹²

Such a pull toward mediocrity is of course not limited to school children—it occurs at all ages at which primary groups are spontaneously formed. A potentially superior member comes to realize that he faces the choice between concealing his intellectual interests or finding himself losing his position in the group.¹³

Social life opposes superiority in still another way, through a constant social pressure to communicate intelligibly. Original individual thought develops most readily in privacy, and can be inhibited by a felt need to make sense to others at all times. A rich social life in primary groups allows

little opportunity for such mental privacy, and includes an atmosphere of disapproval of the person who at any time expresses a thought difficult for his friends to grasp. This atmosphere may involve implications of conceit and even a touch of mental abnormality.

There is a parallel, though not identical, process which allows for social influences in broader categories of society to limit aspirations. The large family and neighborhood community has been shown to influence attitudes and expectations toward education and mental development. Occupational status of fathers is statistically related to vocational ambitions of sons.¹⁴ Even sons who aspire to a level above that of their fathers usually tend to limit their goals to a moderate ascent above the achievements of their fathers.

At the top limit of performance for some persons there seems to be an additional aspiration barrier, as if a demon were establishing a line beyond which performance could not possibly go. Few persons can summon their maximum effort against what they conceive to be an absolute impossibility, but their powers may be released if they are shown, by the example of achievement by a person they view to be comparable, that the thing can be done. Such an *aspiration boundary* probably accounts for the long delay of track athletes in performing a four-minute mile run. For years great runners had come close but failed to beat the clock across the magic line. Extrapolations from world records over shorter and longer distances indicated that comparable running ability should make the feat possible, but there were athletes and sports experts who questioned that it would ever be done. In 1954, however, Roger Bannister achieved it, breaking not only the record but also the aspiration boundary for many talented athletes. By the end of 1960 the four-minute mile had been performed 66 times.

It appears probable that a similar aspiration boundary effect operates with reference to mental achievements, and that many persons of high ability have to wait for New-

¹² See Matilda W. Riley and S. H. Flowerman, "Group Relations as a Variable in Communications Research," *American Sociological Review*, 16 (April, 1951), pp. 174-180. The authors find that membership in school children's peer groups implies mediocrity ". . . since basically all peer oriented youths aspire to be like each other, on a level which the majority can reach."

¹³ Some choose the second course and accept loneliness and unpopularity as an unavoidable price for the satisfactions of mental achievement. A fortunate few may find comrades of their own level and have the best of both mental adventure and group life, but for the extremely superior this is seldom possible. Norbert Wiener, for example, during his "square peg" period at Harvard, ". . . tried at one time to unite the five of us (all prodigies) into a sort of prodigy club, but the attempt was ridiculous. . . ." Norbert Wiener, *Ex-Prodigy*. New York: Simon and Schuster, 1953, p. 139.

¹⁴ See Seymour M. Lipset and Reinhard Bendix, *Social Mobility in Industrial Society*. Berkeley: University of California Press, 1959. Chapter IX, "Intelligence and Motivation" (pp. 227-259) reviews the evidence on this point.

tons and Einsteins to show that the looming redoubts are not invulnerable. Persons of lower ability, of course, cannot so readily be inspired by the genius at the top, but the same effect may occur at their level. In the days when all great American writers appeared to be in New England, General Lew Wallace inspired a sequence of worthy Indiana writers by his production of *Ben Hur*. It would seem that we sociologists could learn much, and profitably apply the knowledge, from the study of the effect of successful achievements on lifting the aspiration boundaries of the colleagues of the achiever.

The foregoing discussion is meant only as a sample of some of the ways in which the society, and its subgroups, may regulate in a variety of inconspicuous ways the general level of aspiration and performance among its members. It appears that immense potentialities of human abilities are being smothered by systematic social influences which tend to hold achievement toward the medial level of a group or a community. Only a few escape from such influences—the rest aim and achieve at a level near that of their closest social groups.

The central implication of the present argument is that attractive potentialities of increase in collective ability are possible if we advance our knowledge of the sociological influences that stimulate and limit aspiration and achievement, and find strategic points at which we may establish some control over them. No great difficulties appear to stand in the way. It appears that we only need to apply a massive research effort in the field of the relation of social factors to abilities. Fortunately there exists today a nation-wide enthusiasm for the development of talent resources; a milling crowd is stirring into action even in advance of academic sociological leadership.

Public support of facilities for formal education has never been more enthusiastic, and money for paying teachers has never been easier to find. There is more support than ever before for stimulating a higher proportion of students to pursue advanced education. Trials abound of new approaches to teaching methods, some with spectacular implications of the unused powers in our children. Of these, two merit special mention here. At Stanford University, Patrick Suppes

has recently been conducting an experiment with first grade children, in which the approach to arithmetic is made through set theory, which the children appear to grasp easily. At Yale, Omar K. Moore has successfully arranged to have an experimental group of thirty-five pre-school children learn reading, writing, printing, and typing. One of his subjects at the age of 2 years and 11 months has been filmed in the act of reading a first-grade story.

Also significant, if less bold, are such new developments as the ferment of Honors Plans in the colleges, the increase in the supply of fellowships to draw the best students into advanced study, the development of methods of testing and identifying potentially superior students, and various plans for enrichment and acceleration of instruction.

All of this school effort is to the good, and vigorous support of it will surely produce rewards. Even greater benefit, however, may in time result from the discovery and application of knowledge in the influence of other aspects of social life on ability. The schools, however improved, will not perform the tasks which belong to the family and the community. It is not enough to know how to offer a subject, say a foreign language, by the most advanced instructional methods if the subject is meaningless to the student. We have not yet faced the question of what the significance of academic study of the Spanish language is to the daughter of a Minneapolis dentist who plans to marry a farm-implement salesman of Norwegian descent. Nor have we learned to bring students to college with an effective appetite for the types of knowledge most useful to themselves and the nation. At present business training, home economics, and physical education outnumber mathematics, physics, sociology, and philosophy in the expressed academic intentions of high school students.

In the present opera on the nature and destiny of man's genius, we have heard only the opening bars of the overture, but the music suggests that the production will some day be a success, and that the amount of effort we put into it will make a difference in the time required. Biology and genetics, while not entirely irrelevant to the cause, promised more than they could deliver in

the early years of the century. Individual psychology has taught much, but now we perceive evidence that an important part of the relevant causation of abilities is essentially sociological in nature, and that control is most likely to come through penetration of this aspect of the subject. Research in the sociology of collective ability thus promises to give us an unmatched opportunity to apply advanced techniques of discovery to a matter of critical human importance.

Men of wealth, position, and responsibility wishing to provide security for their children, find that there is actually no way of having absolute assurance that a fortune can survive. Currency can fluctuate in value and deteriorate through war and inflation. Gold

and diamonds have arbitrary worth which can vanish with economic disorganization. Land can be taxed away or confiscated by agrarian reformers. No kind of material wealth is more secure than the social organization which stands back of it. The most favorable chance of survival, therefore, eventually goes to persons of highest general ability and wisdom who can deal with problems of complexity in a time of change. Effective intelligence, then, is a richer legacy than acres of diamonds, not only to the heirs of a tycoon, but also to the posterity of a nation. To learn how to expand the heritage of collective intelligence would create the best legacy we could leave to the children of our children.

FUNCTION AND CAUSE

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The paper first examines the relations between functional and causal analysis, and concludes that a statement about the function of an institution can be made relevant to a causal analysis of the development of that same institution only (legitimately) by additional assumptions concerning human motives or evolutionary selection or (illegitimately) by use of the postulate of necessary integration. Secondly, it argues that only events can properly be related by causal laws and that questions about the functions of institutions (considered as constructs from observed events) logically imply questions about the causal effects of the events from which they are constructed. It finally seeks to classify approaches to sociological analysis with respect to these two theses and to indicate those differences which stem from different methodological assumptions and those which reflect different value preferences.

KINGSLEY DAVIS has argued that we should abandon the notion that functionalism is a special form of sociological analysis.¹ It is sociological analysis, albeit occasionally clouded by misleading terminology. In at least one reader the effect of his thoughtful and wide-ranging paper was to stimulate reflection on our notions of function and cause and on the relations between them. The starting point of these reflections was the question: Does not Professor Davis' argument rest on a special and hardly universal view of what sociological analysis is or should be?

At one point he commends functionalism as having "helped to make a place in sociology and anthropology for those wishing to explain social phenomena in terms of social systems, as against those who wished to make no explanation at all, to explain things in terms of some other system or to plead a cause." Sociological analysis, in other words, is the explanation of social phenomena in terms of social systems. But surely cause-pleading, explanation in terms of other systems and so on are not the only alternatives. There is another position, equally sociological, equally analytical, which holds that sociologists should search for regularities in the concomitant occurrences of social phenomena, seek to induce causal laws from such regularities and seek eventually to

¹ Kingsley Davis, "The Myth of Functional Analysis as a Special Method in Sociology and Anthropology," *American Sociological Review*, 24 (December, 1959), pp. 752-772.