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Intelligence, engineered invisibility, and the destruction of life on Earth
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John Raven
Edinburgh, Scotland

Abstract

This paper was precipitated by the contrast between conclusions in Gottfredson (1997) and those emerging in Raven and Stephenson (2001). Gottfredson assembled data supporting three main claims: *g* is *the* major variable responsible for variance in occupational performance; *g* is the most important variable determining the effectiveness of behavior outside work; and the status of occupations derives directly from *g*. We show that in the workplace and educational system, other qualities *are* important but remain invisible. This invisibility, limited criteria of performance, and misleading representations of the efficiency of hierarchy contribute to a network of social forces. The understanding of the operative socio-cybernetic system generates an effective socio-cybernetic system and identifies the competencies and tools required to run it.

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Overview

In a wonderfully documented paper, Gottfredson (1997) not only argues that *g* is the major variable responsible for differential performance in all walks of life (or at least the only one whose contribution can be demonstrated with the assessment instruments currently available to us) but also the main factor lying behind our hierarchical social order.

In this paper, it is first shown that, at least in the workplace and the educational system, numerous other qualities *are* important but remain invisible if one tries to demonstrate their importance using tools developed within the traditional measurement paradigm and especially if one accepts the traditional criteria of job performance and the functionality of our hierarchical organization of workplaces and society.

Next, it is argued that all of these things--failure to utilize the wide range of hidden talents that are actually available, the dominant criteria of job performance, and our hierarchical social order--are seriously socially dysfunctional in the short term and, more especially, in the longer term.

However, it is then shown that all three things--the invisibility of most talents, the limited criteria of performance, and the misleading representation of the efficiency of hierarchy--contribute in crucial ways to a wider network of social forces which constitute a self-perpetuating system that is heading us toward, not only our extinction as a species, but the destruction of all known forms of life.

It therefore seems vital to develop more systematic ways of illuminating and intervening in such networks of forces.

Our studies of the educational system are used to illustrate how this can be done. It is shown that such networks of forces, better termed "socio-cybernetic systems", can be exposed, as Hamilton, Jenkins, King, MacDonald, and Parlett (1977), Parlett (1972,1976), and House (1991) have suggested, by using psychological data in an innovative way.

The resulting understanding of the operative socio-cybernetic system can then be used to generate a specification for a more effective socio-cybernetic system and identify the competencies and tools required to run it.

It is suggested that the process is akin to using Newton's re-conceptualization of "force" to de-animate the wind, add keels to sailing boats to harness previously invisible forces in the sea, and then develop an appropriate socio-cybernetic system consisting of charts of the seas and the stars, networks of lighthouses, and chronometers to enable sailors to track their position to develop an effective and safe navigational system.

Part I: Other Qualities Are Important

Evidence From the Workplace

Gottfredson's first claim--i.e., that *g* and not much else has predictive validity in occupational settings--has already been well supported by data brought together by such authors as Schmidt and Hunter (1998), Jensen (1998), and Ree, Earles, and Teachout (1994). Nevertheless, hugely impressive though the assembled data are, they are not entirely convincing.

One reason for this is that much depends on job definitions and performance appraisal systems which may overlook many important contributions.

As I have argued in greater detail elsewhere (J. Raven, J. C. Raven, & Court, 1998), there is enormous tension between the assumed job definitions put forward in, for example, the writings of Jaques (1976, 1989) and the results of more empirical studies of the kind published by Kanter (1985), L. M. Spencer and S. M. Spencer (1993), Huff, Lake, and Schaalman (1982), Desjardins and Huff (2001), Schön (1973, 1983, 1987), Russ-Eft and Brennan (2001), and the author (Raven, 1997).

In the course of hundreds of studies using fine-grained methodology--and especially *Behavioral Event Interviewing* (a variant of Flanagan's *Critical Incident Technique*)--it has been shown that effective organizations call on their "low-level" employees (lavatory attendants, machine operatives, sales people, etc.) to utilize high-level competencies.

Yet this fact cannot show up in studies grounded in correlations between psychological tests and job performance. This arises in part because the classical test armory, as a result of the psychometric model adopted, contains no good measures of the relevant qualities and in part because the criteria of occupational performance adopted in virtually all these studies leave much to be desired: If, as is often the case, managers and supervisors believe that the jobs of "low level" employees involve following rules without thinking it creates a self-fulfilling propensity so that other features of performance are unlikely to show up in the studies those managers commission. What is more, as will be discussed more fully below, people's contributions are very much determined by what others do and the effects of their actions are absorbed into group processes. They cannot be easily isolated using conventional methodology such as performance ratings. Yet the importance of taking these other variables into account is well illustrated in the work of Hogan (1990), Hogan, Raskil, and Fazzini (1990) and others who have shown that large numbers of highly "intelligent", socially skilled, organizationally acute, and socially poised managers do not do the jobs they are expected to do but instead drive their organizations into the ground for the sake of personal gain. In other words, they use their "intelligence" to achieve personal, not social or organizational, goals. Yet their social skills--including their ability to remove anyone who voices contrary observations--enable them to avoid detection.

Even *Behavioural Event Interviewing*, despite the great service it has done us by drawing attention to the importance of a huge range of occupational competencies overlooked by others, fails (because of its preoccupation with “superstars”) to reveal the full extent of the problem. As Adams and Burgess (1989) have perhaps shown better than anyone else, the culturally-based image that is activated when we are asked to nominate “superstars” makes it unlikely that we will suggest people who are good at pouring oil on troubled waters or at wrestling in private with a conceptual problem and then passing the solution on to someone else who will do something about it. Yet, as both Adams and Burgess and Kanter have shown, people who do such things are crucial to the creation of the cultures of intelligence or enterprise that are required for organizational survival and development.

Evidence From the Educational System

So far, I have dwelt on doubts about the validity of the “g and not much else” thesis raised by our work in the occupational area. Equally serious doubts stem from our work in schools (Raven, Johnstone, & Varley, 1895). In the course of this research (which was carried out in both elementary and secondary schools) we observed that, when teachers set out to nurture high-level competencies through inter-disciplinary, enquiry-oriented, group-based, project work conducted in the environment around the school, huge numbers of talents, at best only marginally related to g, come to light.

Thus, in one elementary school (Raven et al, 1985; Raven, 1994, 2000, 2001a,b&c), we found the pupils engaged in a project designed to get something done about the pollution in the local river. The project, its organization, its effects, and the problems it posed for evaluation all merit detailed discussion, but only the briefest account can be given here. Interested readers should refer to one of the sources cited. Some pupils decided that the first thing to do was to measure the pollution in the river. Some of them then set about collecting samples of the river water and trying to analyze it. This took them to the not-so-local university where they worked with the lecturers. Note that these pupils were developing the *competencies* of the scientist: The ability to identify problems, the ability to invent ways of investigating them, the ability to obtain help, the ability to familiarize themselves with a new field, and the ability to find ways of summarizing information. Other pupils decided that more progress was to be made by studying the dead fish and plants along the river bank. Still others argued that all this was beside the point: The river was clearly polluted and the problem was to get something done about it. Some then set about drawing pictures of the dead fish and plants with a view to releasing community action. The objective was not to depict what was seen *accurately*, but to represent what had been seen in a way that would evoke emotions that would lead to action. While the “scientists” mentioned above sought to describe the results of their work in what might be termed a classic academic format, other pupils again argued that that was irrelevant and set about generating slogans, prose, and poetry that would evoke emotions that

would lead to outrage and action. The *criteria* for what constituted effective reading and writing thus differed markedly from those which dominate most classrooms and they varied from pupil to pupil. Still other pupils argued that, if anything was to be done about the river, it was necessary to get the environmental standards officer to do his job. (It turned out that he knew all about the pollution but had done nothing about it.) This led some pupils to set up domino-like chains to influence politicians and public servants. This in turn led the factory that was causing the problem to get at the pupils' parents saying that, unless this teacher and her class was stopped, they would all lose their jobs. Unabashed, some pupils set about examining the economic basis for the factory's claims.

Note that this teacher was not so much concerned with enhancing pupils' specialist *knowledge* in each of these areas (though, even if it had been, documenting that knowledge would have posed insuperable problems for evaluators steeped in classical measurement theory because the knowledge to be documented was largely idiosyncratic and tacit¹) but to nurture a wide range of *different competencies* in her pupils. These competencies were not limited to substantive areas of investigation but also included the ability to contribute to group processes, including such things as the ability to put people at ease, the ability to de-fuse the intolerance which develops between people who contribute in very different ways to a group process (e.g., the intolerance of the "artists" for the "scientists"), the ability to publicize the observations of the quiet "ideas person", and the ability to "sell" the benefits of the unusual educational process to parents. The teacher in fact devoted considerable attention to highlighting the different types of contribution which different children were making to the group process. As a result, they stopped thinking of each other in terms of "smart vs. dumb" and instead noted what each was good at. In this way, the normal process of school-based differentiation was turned on its side. When this process appeared not to be working, the teacher would initiate discussions of what individual pupils tended to do spontaneously outside school and how those motivations could be tapped to elicit behavior which would make a contribution to the group process.

Particularly in an American context, it is important to emphasize that the work just described, while superficially similar to the work reported in the hundreds of accounts of project-based education that are to be found in the literature (reviewed in Raven, 1994), was in fact dramatically different to most of them because the notion of *what was to be learnt* was different. Pupils were to learn to lead, to invent, to put people at ease, to create political turbulence, etc. The objective was not that they should "learn" in the sense of acquiring stocks of standard, formal, low-level,

¹ Lester (2001) has delightfully argued that, despite almost universal beliefs to the contrary, *knowledge* is the one thing that that one *cannot* assess because it is largely idiosyncratic and tacit. In another article, Gottfredson (2002) has also drawn attention to the nonsense of Sternberg trying to assess "tacit" knowledge using tests of explicit knowledge.

verbal *knowledge*. The ability to build up idiosyncratic combinations of up-to-date specialist knowledge--yes--but that was different. The dozens of projects of this sort studied by Grannis (1983) and ourselves thus went far beyond those described in the widely publicized work of Gardner and his colleagues (Gardner 1987, 1991; Hatch & Gardner, 1990; Krechevsky & Gardner, 1990). The teachers we are talking about here were not dealing with six or seven “intelligences” or areas of skilled performance but with the ability to carry out one or another of a huge range of necessary, and mutually supportive, activities. It is true that all of these demand and reveal some form of intelligence and related abilities of the kind indicated by such terms as “the ability to observe” and “the ability to reason”. But they also demand a wide range of additional components of competence--the ability to learn from the effects of one’s actions and modify one’s behavior accordingly, the ability to persist, the ability to get help, and so on. It is also vitally important to note that none of these components of competence can be meaningfully developed or assessed generically--across all kinds of potentially valued activity--but only in the context of the specific activity being undertaken. Thus one person will display a great deal of creativity while creating classroom disruption, another while putting people at ease, and another while finding ways to undertake a scientific study. And none of them can be meaningfully assessed by asking them to construct something “creative” out of a collection of toy bricks.

Conclusion to Part I

It follows from the material briefly summarized here that other qualities besides *g* are vitally important--a conclusion which in no way contradicts Gottfredson’s main thesis, although it does undermine the second half of the statement “*g* and not much else”. The question the data pose is “Why, under the circumstances, has so much weight been placed on *g* alone in the workplace and society?” As we have seen, people can use their “intelligence” to *undermine* the workings of their organizations and society.

In fact, the data so far presented go some way toward answering that question: To capture these other qualities it would be necessary to develop a very different way of thinking about and assessing human resources.

As it happens, Spearman (1927) had noted this entire problem and the direction in which its solution should be sought almost a century ago. He wrote: that “Every normal man, woman, and child is ... a genius at something ... It remains to discover at what ... This must be a most difficult matter, owing to the very fact that it occurs in only a minute proportion of all possible abilities. It certainly cannot be detected by any of the testing procedures at present in current usage. But these procedures are capable, I believe, of vast improvement”. He also noted, first, that the *g* for which he is famous (and which lies at the heart of Gottfredson’s thesis) had emerged from the correlations between tests (administered within the so-called educational system) that lacked

construct and predictive validity². And, second, that that “educational” system itself, as it actually operates, rests on a fraudulent claim because the word “education” comes from the Latin root “educere”, meaning “to draw out”, thus implying the nurturance of diversity. If it does not mean “to put in”, its outcomes cannot meaningfully be measured using tests of the kind that are most widely employed.

Given that both the multiple talent problem and the route toward its solution were noted so long ago and so little has happened one is forced to look for some explanation of why so little has happened. Much of the remainder of this article will be devoted to so doing.

PART II:

The Ways in Which Widely Accepted Assumptions in Psychology Contribute to Invisibility

a. There are basic flaws in the dominant measurement paradigm in psychology and the requisite psychometric model is at loggerheads with classical test theory.

It is easiest to illustrate some of the problems which assessment of the qualities discussed above pose for the classic assessment paradigm in psychology by reviewing the psychological nature of qualities like the ability to reason, take initiative, and work effectively with others.

All of these are difficult and demanding activities which people will neither develop nor display their competence to undertake unless they are engaged in tasks they care about. Furthermore, “the same” activity looks very different in different contexts--just as copper looks very different when combined only with oxygen and when combined also with sulfur. Can one doubt that those whose task it is to remove dents from damaged cars (or to craft the panels of superb prototypes) “think” about what they are doing and learn from the effects of their actions even though that thinking and learning would not show up on conventional intelligence tests? Yet, as Spearman noted, the number of things that one person or another is strongly motivated to carry out is legion. It follows that extending the classical framework to 7 or 9 different “types” of intelligence does not address

² As discussed more fully in Raven (1991) there is no sense in which a traditional “science” test assesses the competencies of the scientist: The ability to problematize, conceptualize, locate relevant earlier work, familiarize oneself with the relevant theories, built up a unique store of up-to-date specialist information, invent ways of collecting data, gain help, raise funds, find ways of summarizing data, and do on. Nor does it provide an index of knowledge of any kind of genuine sample of scientific facts ... since, with the knowledge explosion, this domain is vast. Instead, performance on these tests reflects only the ability to retain for a short while, and regurgitate, a sample of facts chosen by an authority (i.e., abdication of responsibility for learning and evaluation of the relevance of what is learned and/or the ability to present the material in a way which will appeal to the examiner - i.e., a concern with self-presentation rather than scientific knowledge). Likewise there is no sense in which the ability to answer nine questions about a paragraph unconnected to the respondent’s knowledge will index any meaningful reading competence since that depends on such things as the ability to find information related to one’s purposes, to use that information to provoke lateral thinking, to evaluate and escape from blind alleys--that is to say to refuse to read and try to understand the irrelevant--and the ability to evaluate and reject and avoid wasting time on that which is irrelevant or erroneous. It follows that, for these and related reasons, most of the tests in common use cannot be said to measure that which they purport to measure: i.e., they lack construct validity.

the problem. Different people are preoccupied with “thinking”, usually non-verbally, about very different things. All are creative while carrying out activities they care about--whether those activities involve creating social disruption, crafting a beautiful vase, developing a new scientific theory, establishing a harmonious personal relationship, or anything else.

It follows that constructs like the ability to reason, self-confidence, and creativity--which psychologists have for more than a century sought ways of measuring--cannot be assessed in the way the currently dominant paradigm suggests. They cannot be measured by presenting everyone with a common task. To “measure” them one must *first* find out what it is that the individual is strongly motivated to do and then find out *which* of a number of cumulative and substitutable components of competence that they could, from a theoretical point of view, bring to bear to carry out that activity effectively they do in fact exercise. As we have seen, Spearman claimed that “this must be a most difficult matter, owing to the very fact that it occurs in only a minute proportion of all possible abilities”. But, given the right conceptual framework and appropriate analytic techniques, can one seriously believe that it would be any more difficult than identifying the elements and compounds present in all the substances we encounter every day?

When it comes to the concept of validation, one encounters similar problems. In the workplace, people are not usually doing what other people think they are doing: One manager is preoccupied with advancing himself in his career by running a “lean, mean” organization and getting rid of all the staff who would create a future, another with creating network-based working relationships which lead to the evolution of new products, another with enhancing the short-term value of the company by manipulating its image on the stock market, and so on. As previously mentioned, Hogan and his colleagues (Hogan, 1990, Hogan et al., 1990) have demonstrated that some 50% of American managers are so preoccupied with personal advancement that they drive their organizations into the ground.

Thus, to find out whether a test that claims to measure a quality like “the ability to think” does in fact do so, one cannot use criteria like supervisor’s ratings or productivity (which is, in any case, a *group* rather than individual characteristic). In other words, one cannot “validate” tests in the manner prescribed in most textbooks on the subject. One has, somehow, to get inside people’s heads and find what they “think” *about* before one can make any meaningful statement about how well they can think.

In short, not only is the classic, internal-consistency based, measurement paradigm incompatible with the psychological nature of the qualities we have seen to be so important, so are the procedures conventionally prescribed for the validation of tests.

b. Psychologists have failed to study the emergent properties of groups.

It is widely accepted in throw-away comments made by psychologists that people are unable to function without a context and that their apparent characteristics, their behavior, and the effects of

their behavior are very much determined by the context in which they live and work. Yet Kanter's (1985) research is almost alone in enquiring into these things. It emerges that the development and survival of organizations is almost entirely dependent on what takes place in what Kanter terms "*parallel organization*" activity. During the time devoted to such activity, people come together in a network of fluid groups in which they function in ways that are *not* included in their job descriptions, deploy talents that are typically invisible and overlooked as they perform their day-to-day jobs, and adopt working practices in which the hierarchical distinctions characteristic of the day-to-day operation of the organization are rendered inoperative. How can such observations not undermine the seeming strength of Gottfredson's thesis?

Not only has the work of psychologists generally been limited to the study of a few dominant "variables" that are said to capture the main ways in which human beings differ from one another, it has focused almost exclusively on the individualistic relationships between personal characteristics and performance. Psychologists have almost entirely failed to study the ways in which the emergent properties of groups are, on the one hand, dependent on the diverse qualities of idiosyncratic individuals and, on the other, transform the properties of those individuals.

The implications of these oversights can be made more obvious by drawing an analogy from chemistry. We may first ask: Where would chemists (or biologists) have got to if they had sought to describe all the variance in chemical substances (or species) in terms of one, two, five, or even sixteen "variables"? Having come to terms with the answer to that question we may note that the properties of copper sulfate cannot be predicted by adding the individual properties of copper, sulfur, and oxygen, and those three substances are not recognizably "the same" when studied in combination and when considered individually. Clearly, we have been headed down a blind alley. What we need is a *descriptive*, combinatorial, interaction-with-the-environment, model: A model akin to atomic theory in chemistry or to a biological classification accompanied by an account of ecological interactions and feedbacks.

c. Psychologists have accepted a great deal of sloppy thinking about "scientific methodology".

One network of beliefs supporting the hegemony of what can now be seen to be an inappropriate measurement paradigm is associated with the concepts of "objectivity" and "validity" that have informed the studies carried out by psychometricians and educational researchers and that find expression in such things as the recommendations of the Joint Committee's *Standards for the Evaluation of Educational Policies and Programs* (1981) and the International Test Commission.

The conventional wisdom in this area expresses itself in the recommendation that 'only reliable and valid tests' shall be used in any evaluation of people or programs. Apparently reasonable though this recommendation is, its *effect* is to destroy any semblance of objectivity and professional competence in the evaluations conducted.

Since there are no good measures of the main objectives and outcomes of the kind of interdisciplinary, competency-oriented, enquiry-oriented, project-based education discussed earlier, the requirement that only reliable and valid tests be used in its evaluation induces researchers (who want the money and the publications) either to admit that they cannot do what they have been asked to do (knowing that someone else *will* take the money and claim to do it) or to use only *irrelevant* tests. Yet how can an evaluation which uses only irrelevant tests to evaluate the supposed effectiveness of an educational program be considered either scientifically competent or objective? Yet it has been precisely the results of such studies that have been used to close educational programs like that discussed above. In the absence of measures of the objectives these programs set out to achieve (and in the absence, by the same token, of measures of the dysfunctional effects of the classic “educational” programs with which they are compared) study after study has failed to document their genuine benefits while showing that they did not increase scores on conventional measures of reading, writing, and counting. In other words, the benefits of those programs and the disbenefits of alternatives have been rendered invisible. The result has been that educational programs designed to nurture high-level competencies have been judged worthless and closed down--and this despite the fact that (i) these are the *only* school-based activities that merit description as “education”, (ii) they are the *only* programs which nurture the talents that are required if our society is to be transformed in such a way as to have any chance of survival, and (iii) traditional programs confer huge *disbenefits* (such as feelings of incompetence and trained incapacity) on those who pass through them (see Raven, 1994 for evidence supporting these statements).

In reality, such evaluations--whose main fault is a lack of *comprehensiveness*--can only be considered incompetent, lacking in objectivity, and highly unethical. By failing to document that by rendering invisible, discounting, and failing to develop most children’s talents they contribute to the process whereby schools inflict further damage upon most children. Worse, by failing to note that schools are failing to nurture the very talents that are required to transform our society in such a way that our species will *have* a future they are contributing to the headlong plunge of our species toward extinction carrying all known forms of life with it.

The same comments apply to assessments of *individuals*. How can an evaluation that reports that someone has “a below-average IQ” but fails to report that he or she is outstanding at creating the kind of political turbulence that is required to introduce the changes that are so urgently required in our society be considered as objective, fair, competent, or ethical?

PART III: Invisibility Driven by Wider Social Processes

Having examined the contribution to the invisibility of many important components of competence that derives from what might be considered to be assumptions or axioms arising within

the discipline of psychology itself, we now consider the contribution of some wider social processes that seem to be operating.

1. Processes operating in schools.

We may begin by noting that most educational activity of the kind discussed above has been purged from schools--and not only state schools--in the UK. This has been achieved through the government's insistence that all schools follow the same "national curriculum" (a curriculum which in some areas, such as literacy, defines what all teachers will be doing with all pupils for every ten minutes of the day, thereby depriving teachers of the opportunity to adapt what they are doing to the needs of individual pupils). Not only are schools required to follow the same narrow curriculum and submit to the same narrow-minded inspections, their pupils are assessed using the same tests. In this way teachers are induced to attend more closely to the prescriptions of authority than to the needs of their pupils.

Even more disturbing--and perhaps revealing--than the seemingly deliberate purging of genuinely educational activity from schools is the fact that schools have been forced to concentrate on activities that are probably worse than useless. This is revealed by three related observations. The first is that, as mentioned above, both Spearman (1926) and I (Raven, 1991) have shown that the tests that are used to evaluate educational performance lack construct validity. The second is that, as the work of many researchers whose work has been included in Schmidt and Hunter's (1998) meta-analyses have demonstrated, these tests lack any predictive validity outside the school system. And the third is that the knowledge that is so painfully communicated and tested in schools is out of date when it is taught, does not relate to the problems people will have to tackle when they leave school, and, since knowledge has a half-life of a year, is forgotten by the time it is needed (for evidence supporting these statements see Raven, 1994).

To say the very least, these observations point to the conclusion that there may be some hidden forces at work to ensure that schools fail to nurture high-level competencies (while proclaiming the opposite) and suggest that what is actually being promoted may have some hidden function that is not openly discussed.

A number of authors have suggested what that hidden (or "latent") function of the system might be. Jencks et al. (1973) suggested that it might be to "legitimize the rationing of privilege". Nuttgens (1988) suggested that it might be to "promote those who are least able to do anything" into influential positions--i.e., to promote those who are most willing to do whatever is necessary to secure their own advancement in a network of systems which, like the "educational" system, fail to deliver what they claim to deliver, those most likely to echo the lies on the basis of which our society operates, and those least interested in acting in the long-term public interest--that is to say those least concerned to enact ethical observations.

But perhaps it might have a still deeper function. Perhaps its function is, in combination with other processes noted by Shiva (1998) (and to be discussed below), to divert attention from what is really going on and to contribute to a network of activities “designed” to exterminate our species and destroy all life known to us. To contribute to suspension of disbelief in such a suggestion we may note that Robb (1989) has argued that this is indeed what the laws of physics would lead one to expect. Things should tend, not toward the complexity and the increasing orderliness of life, but toward entropy, disorder, and chaos. Thus the ‘function’ of *Homo Sapiens* on this planet may be to engage in behavior which will restore processes which Gaia should never have undermined.

To explore the possibility that there may be some truth in at least the less extreme of such hypotheses, let us now examine some of the forces which deflect schools and universities from their manifest, and widely supported, educational goals. Given the tendency to unthinkingly describe what goes on in such institutions as “education”, it is important to begin by making the problem explicit. One way of doing this is to note that one of the major conclusions Goodlad (1983) reached from his extensive research into “a place called school” was that the activities which dominate them consist of low-level, non-developmental, repetitive activities which in no sense merit description as “educational” or “academic”. This is because the word “education” comes from the Latin root *educere*, which means “to draw out” ... to draw out the diverse talents of students ... and the word “academic” involves such things as critical analysis and the formation of good judgments. Goodlad’s observations are supported by our own work and that of many others (for a review of our own work and that of others, see Raven, 1994). They are also strongly supported by the data assembled by Flanagan (1978) and his co-workers after interviewing the *Project Talent* sample about the connection between school and life when they were aged 30. As Tyler (1976) observed, the only conclusion one could reasonably draw from these data was that the schools should be closed. Ominously, she added that it would not be possible to act on this insight because of the sociological functions performed by schools.

What is staggering is that this situation exists in a context in which more than 80% of parents and pupils want schools to offer genuine education--to develop the idiosyncratic talents of all pupils and, in general, to nurture qualities like the confidence and initiative required to introduce change and the ability to communicate³. As if this were not enough, hundreds of studies of the kind discussed above of the competencies required in the workplace (see reviews in Raven, 1997

³ Work supporting this conclusion has been carried out in many different countries over a long period of time, see, Raven (1994) for a summary and Bill, Trew, and Wilson (1974); Johnston & Bachman (1976); Goodlad (1983); Centre for Educational Sociology (CES) (1977); MacBeath, Mearns, Thomson, & How (1981); De Landsheere (1977); and Gray (1983). It is important to note that, although Goodlad ends up claiming that parents overwhelmingly support the social allocational functions of schooling over and against its educational goals, this conclusion stems from the forced-choice methodology that he deliberately introduced to resolve the “problem”, as he shows in the chapter, “*Parents Want it All*”.

and Spencer, 1983) and society (e.g., Flanagan & Russ-Eft, 1975, but see Raven & Stephenson, 2001 for a review) have underlined the accuracy of these opinions. And these goals have lain at the heart of the writings of educational philosophers from time immemorial. Indeed, as we have noted, they inhere in the very word “education” itself since that word derives from the Latin root “educere”, which means “to draw out”, not “to put in”.

In contrast, the activities which dominate schools have been shown time and again to confer few developmental benefits on students (e.g., Flanagan, 1978; Johnston, 1973; Johnson & Bachman, 1976; Raven, 1977; MacBeath et al., 1981; CES, 1977; Gow & McPherson, 1980; De Landsheere, 1977; Andersson, 2001). Even the non-developmental (social advancement) benefits of educational qualifications turn out to be largely illusory if those concerned do not already possess the other psychological characteristics typically associated with people with higher educational qualifications (Bachman, Green, & Wirtanen, 1971; Hope, 1984; Steiner, 1999).

In this context, it is perhaps appropriate to examine the way in which multiple-talent educational programs have been driven out of schools in a little more detail--because the bringing *in* of the “national curriculum” and its associated assessment practices has not been the only process at work. It has been paralleled by an active move to drive multiple-talent education--that is to say, all education worth the name--*out* of schools through an orchestrated attack on “open” and “progressive education”. Thus it was that a recent British Prime Minister, John Major, was able to announce that “As from tomorrow, there will be no more ‘play schools’. All children will be sitting in rows facing the teacher and being taught”. (It is significant that this announcement followed removal, through the GERBIL (*Great Education Reform Bill*), of responsibility for deciding on the nature of their children’s education from parents--who have traditionally been much more concerned than most teachers with the wider development of their children--and its usurpation by a central government which accepted without reservation that it knew better than parents what was good for their children.) Not content with attacking progressive education in the state sector, the officials set about undermining private schools with wider objectives, even those specifically set up to cater for those pupils who could not cope with the authoritarian monocultures of state schools. The QUANGO most directly involved (OFSTED) even concocted what later turned out (but only as a result of an almost unique court action) to be an entirely fraudulent attack on Neill’s *Summerhill*.

It is of interest that these developments followed a much earlier, but nevertheless very revealing, standardizing “development”. For some 15 years starting from the early 1960s, committees of the Schools’ Council for Curriculum and Examinations in England and Wales debated the desirability of establishing a common system of examinations. For good reasons, they never came to a conclusion. Then a new Minister for Education established a new committee with a remit to come to a conclusion within six months. The report of that committee (the Wadell Report,

1978) observed that pupils had a huge variety of different talents and that these could only be fostered through very different types of educational program. It noted that workplaces and society required a wide variety of people who possessed very different talents. It therefore (correctly) concluded that there was a need for a wide variety of different types of educational program which would foster very different competencies and in the course of which pupils would master very different areas of knowledge. This led it to the conclusion that it would be necessary to retain a wide variety of examining boards (the equivalent of ETS and ACTS) which would each promote a wide variety of courses covering different content, aim at different goals, and be assessed using different forms, or “modes”, of assessment which would make it possible to give students (and thus their teachers) credit for such things as creativity and critical thinking. Then it did an amazing thing. In one sentence embedded in a long paragraph it said “the results will be expressed on a single scale of seven points in a subject area”. This, of course, negated all the steps--based on all the educational and occupational observations it had made--that it planned to make to promote and cater for diversity. How can the results of educational processes designed to nurture the ability to problematize, collect data, and influence others be expressed on the same scale as the outcomes of a program designed to inculcate the received wisdom about 18th century English history? If one asks oneself what could have caused such an action one can only conclude that the sociological need for a single and unarguable criterion to legitimize the allocation of position and status--and with it a whole social system for rationing privilege--had somehow over-ridden all humane, educational, and occupational considerations.

2. Processes operating in psychology.

We have seen that little has been done to act on Spearman’s insights into the developments that are needed in the century that has intervened. But this generalization is not entirely true. In fact the basis for an alternative measurement paradigm *was* developed by McClelland and his co-workers in the middle of the century (McClelland, Atkinson, Clark, & Lowell, 1958; for summaries of that framework see Raven, 2001a&b). This was ignored or ridiculed by others at the time. And it has since been largely abandoned even by his disciples.

There have been several reasons for this. The first, purely technical, reason may be quickly discussed. This is that, despite the fact that, as I have shown elsewhere (Raven, 1997; Raven & Stephenson, 2001), the words *n.Ach.*, *n.Aff.*, and *n.Pow.* quickly found their way into the echo-the-latest-jargon literature, very few of those who came to bandy the terms about familiarized themselves with their operational definition. Had they done so, they would have found a measurement model that was at loggerheads with classical test theory (including Item Response Theory, a brief explanation of which is to be found in Raven et al., 1998). If they had bothered to look and taken what they found seriously they would have found themselves with a basis for taking the steps needed to come to terms with Spearman’s observation. But most of those who did

bother to look, instead of seeking to understand what they found, simply ridiculed it because it was incompatible with their psychometric mindset. (It has, however, also to be acknowledged that McClelland and his co-workers themselves did not quite recognize what they had done--see Raven, 2000c). They mainly presented their work as dealing with “personality” rather than “competence” and they attributed the differences between the results that were obtained using their own [projective] tests and those obtained by others using classical tests or scales given the same names to what can now be seen to be the irrelevant--if important--distinction between operant and respondent measures rather than to differences in the way in which the constructs were operationalized in the very different measurement models.)

The second set of reasons why so little has been done to act on Spearman’s insights may be that our society needs a single and unarguable criterion of merit to operate as it does and, in particular, to enable it to persist along the self-destructive trajectory on which it has embarked. Instead of, as Gottfredson would have us believe, promoting the most able, the latent function of a single-factor model of “ability” could well be to compel all, against the threat of the destitution and subjection to the demeaning and dehumanizing treatment of the so-called “welfare” services that is with so much visibility heaped on those deemed “less able”, to carry out activities which, like those conducted in the educational system, are conspicuously fraudulent, unethical, and destructive of human well being and capacity to survive as a species.

The first evidence supporting this thesis to be reviewed here comes from the fact that, in the end, the McBer researchers who did most to promote recognition of the need for diversity (if not an appropriate framework to handle it) have, as I have shown in more detail in my chapters in Raven and Stephenson (Raven, 2001a&b), been somehow induced to bring their framework into line with the classical paradigm. This is nowhere more striking than in the contrast between the conclusions about effective teaching which they present in a report prepared for the Department of Education and Employment in the UK (Hay/McBer, 2000) and their earlier work on the topic (Alschuler et al. 1970; Alschuler, 1973; McClelland, 1982a&b), in which they dwelt on the varied, competence-based, qualities that it is important to nurture through the educational process and on the diverse ways in which teachers contribute to a system which actually educates (Huff et al., 1982). In their later work for the UK Department of Education and Employment, the McBer researchers not only accept the traditional, “single-factor”, criterion for judging educational performance (which had previously been shown to be unrelated to any form of competence worth the name--see Alschuler, 1973; McClelland, 1973), they then relate teacher effectiveness, judged in terms of their ability to achieve this outcome, to what amounts to a particular presentation of the 16 competency “variables” listed in the Hay/McBer *Scaled Competency Dictionary* (Hay/McBer, 1996) using multiple regression techniques. Nothing could be more conventional. Nothing could

be further removed from the kind of product which their earlier work would have led one to expect them to generate. How did this come about?

My thesis will be that this reversal was largely induced by what the so-called “market” (performing the dysfunctional functions we have noted) was willing to pay for. Some evidence supporting this claim comes from comments made by Lyle Spencer while he was at work on *Competence at Work* (L. M. Spencer & S. M. Spencer, 1993). In that book, the Spencers sought to develop a framework which would enable them to impose some kind of order on the vast range of competencies which McBer researchers had shown to be important in the course of their numerous studies of many domains of work.

According to Spencer, they set out, following suggestions made in my book *Competence in Modern Society* (Raven, 1997), to develop an “atomic theory of competence”. Unfortunately, the publishers’ reviewers argued that the value and usefulness of such a framework would, because of people’s prior expectations and commitments, be lost on most potential readers. This would mean that there would be little demand for the book and render its production uneconomic. And this, indeed, has been my experience with *Competence in Modern Society*. The Spencers therefore settled for the lesser task of producing a “dictionary of occupational competencies”.

Further evidence that advance in academic understanding has been undermined by what will sell into current organizational structures comes from the way in which, as I have shown in the previously mentioned chapters of *Competence in the Learning Society*, McClelland’s 1958 radical measurement insights have been corrupted back into a classical “variable-based” framework. Even what remained of the original distinctive insights in *Competence at Work* has been obliterated as the contents of that book were distilled down into Hay/McBer’s *Scaled Competency Dictionary* (Hay/McBer, 1996).

So far, this argument has related only to selling a conceptual framework into an academic and consulting market. But it has also proved impossible to sell the very *tools*, based on the new measurement model, which the work of Klemp, Munger, and Spencer (1997), Schön (1973, 1987), Kanter (1985), and others indicates are crucial to improved organizational performance-- and the reasons are revealing indeed.

But before turning to them we may note that, for 15 years, Schon and Argyris ... two of the most respected figures in occupational psychology ... were unable to modify the management-development programs at MIT to reflect the results of Schön’s research (1987). The problem was not only the way in which the discipline-based, technico-rational model of competence was locked into lecturers’ career structures and the assessment procedures used by the college. It also included the reactions of the students. They argued that no one could tell whether they were competent managers or not. Under such conditions, what they had to do was focus on getting themselves promoted. This, they claimed, depended on parading the latest technico-rational jargon in front of

their superiors, or, in other words, doing exactly what the so-called educational system had taught them to do and selected and promoted them for doing.

To return now to the question of selling tools. Not only have we--like Taylor (1973, 1974, 1985, 1986) before us--been unable to sell our books on competence and the effective management of genuine education in commercial quantities ... we have also been unable to sell the tools we developed using the theoretical framework we built up. And the reason is of more than passing interest. Despite the demonstrated importance of managers thinking about, placing, and developing the talents of subordinates (Kanter, 1985; Schön, 1983; Klemp et al., 1977; Jaques, 1976, 1989), not only do only 10-12% of British and American managers (compared with some 40% of Japanese managers) think it is important to do this, even less of them do it (Raven, 1997; Graham, Raven, & Smith, 1987). The reason these managers give for the discrepancy between their priorities and their behavior is that they have no time to do it. But, as we have seen, those who think they should do it are a minority. *Most* managers argue along the lines that salespeople are hired as salespeople and that they should do just that. Despite Kanter's evidence of the vital importance of the activity, they believe that salespeople should not set about telling them how to improve the product, the stock control system, and so on. That is someone else's job. They (the managers) should not have to spend time thinking about how to redeploy staff, worse, how to assemble fluid, network-based, working groups based on *part* of staff time. If they have to think about redeploying their subordinates it shows that the wrong people have been hired and should be fired.

It follows that we cannot sell the tools we have developed to help managers do their jobs without a major investment in organizational development and without corresponding change in managers' job descriptions and in the criteria adopted in the appraisal systems used to assess their competence and judge their performance.

The implications are serious. If the questions "What will sell?" and "In what kinds of courses will people be willing to enroll?" really have a major impact on the scientific paradigms and educational activities we can pursue we need to take the situation very seriously because most governments have signed General Agreements on Trade which commit them, among other things, to "privatize all services (including education) to the maximum extent possible". The effects can be expected to be nothing short of disastrous.

3. Related processes operating in the wider society.

It is time now to set these observations in a wider context, for what we are seeing are some results of, among other things, unthinking (or perhaps somehow engineered) espousal of the kind of reductionist science which requires scientists to focus on establishing the strength of the relationships between one variable and one other variable at a time and to ignore all other inputs and consequences--i.e., to reject any attempt at *comprehensiveness*--i.e., getting a rough fix on all

the effects of the experimental variation on all relevant outcomes and on documenting the multiple interactions between them--that is, to reject attempts to engage in what might, for the sake of a better word, be termed ecological science.

Shiva (1998) has observed that the promotion of monocultures of mind (in both education and in the range of scientific perspectives [theories] that are deemed acceptable) seems to be somehow linked to the promotion of monocultures in society, to the promotion of monocultures in agriculture, and to the unthinking acceptance and promotion of reductionist science. The latter permits and encourages, nay requires, scientists to focus on single variables--such as the relationship between short-term crop yields in response to a particular artificial fertilizer--and to ignore longer term effects on yield, never mind effects on the fertility of the soil, the food chain, the health of those who eat the "foodstuffs", and ecology more generally. The effect is to promote a vision of science which is both deeply unethical (in the sense that it results in the destruction of the habitat our species requires for its survival) and lacking any form of objectivity worth the name.

The net result of the autopoietic⁴ system constituted by these interlinked processes, including the engineered invisibility of which we have spoken, is the headlong plunge of our species toward its own extinction, carrying all known life with it.

Part IV: The Way Forward

A Brief Statement

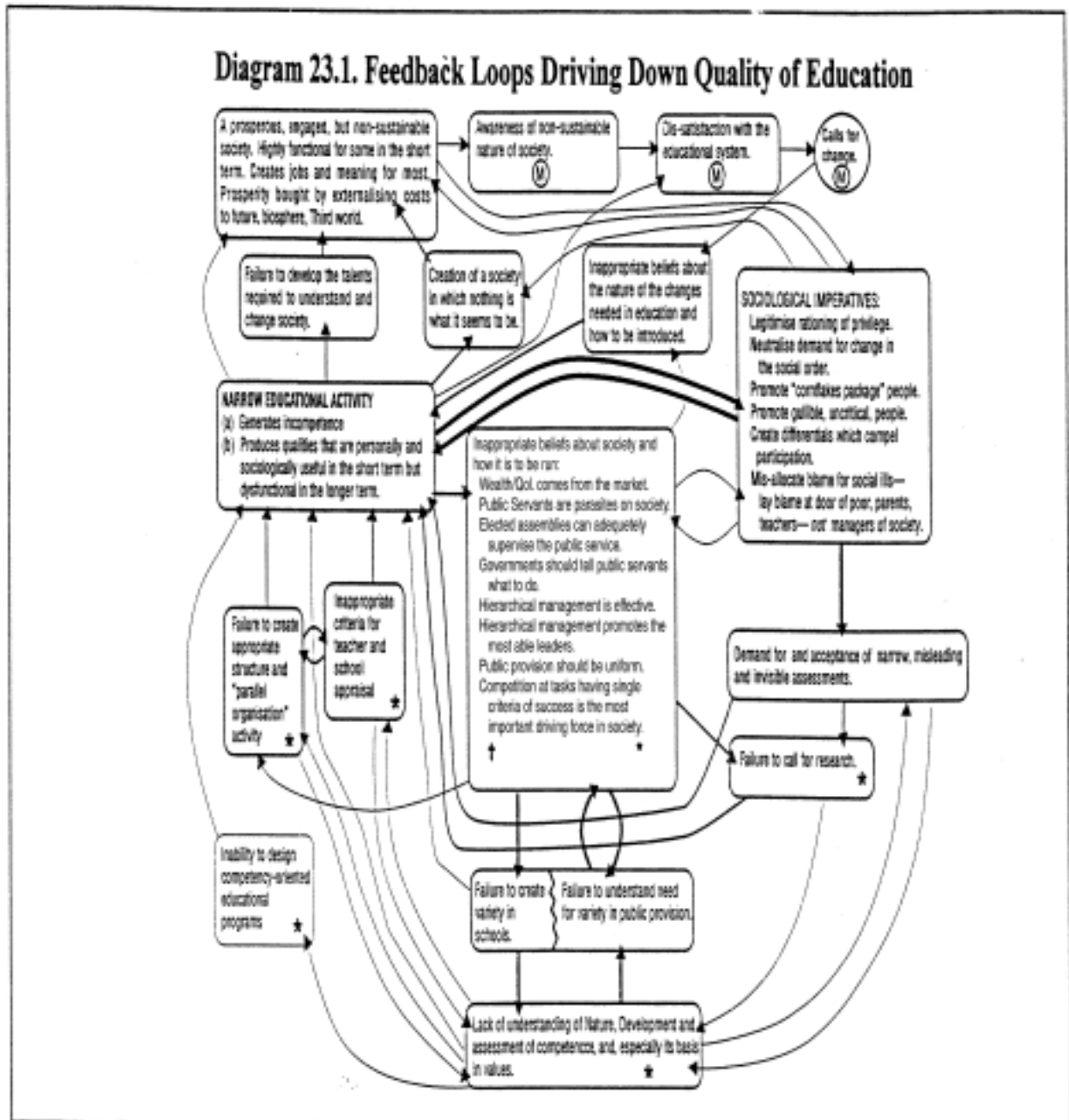
Instead of embracing studies based on the accuracy of the single-variable measures of reductionist science, it would seem that we should, first, acknowledge that the primary criterion that needs to be met to support a claim to objectivity is *comprehensiveness* and, second, articulate what may be termed an ecological image of science in which the dominant concern is to study and map the multiple and interacting feedback loops and intermediary outcomes that are involved. Morgan (1986) and Raven (1994, 1997) have provided illustrations of what such work might look like. But it is useful to give this approach a name. An appropriate name can be derived from the word "cybernetics". Cybernetics is the study and design of guidance and control systems in animals and machines. It is therefore appropriate to use the term *socio-cybernetics* to refer the study and design of guidance and control systems in society.

We may again illustrate the process by reference to our work on the educational system. As a lead into this discussion, I may first mention that, as documented in *Opening the Primary Classroom* (Raven et al., 1985), the effective implementation of individualized, competency-oriented, project based, enquiry-oriented education is just too difficult for most teachers without: (i) better ways of thinking about multiple talents; (ii) a better understanding of the processes to be

⁴ Autopoietic: from Autopoiesis: A process whereby a system constitutes and maintains its own organization.

used to nurture such qualities; (iii) tools to assist in the design and implementation of the individualized, competency-oriented, developmental programs that are needed to harness pupils' individual motives and lead them to develop otherwise invisible components of competence; (iv) ways of giving pupils credit for the idiosyncratic qualities they have developed; and (v) means of giving teachers credit for their otherwise invisible accomplishments--and, especially, for nurturing among their pupils a wide range of diverse talents which could not possibly show up on any conventional test ... never mind any single test.

But these problems, serious though they are, are only the tip of an iceberg. Other crucial problems have to do with the inability of public management systems in general (and not just in education) to cater for diversity (Raven, 1989, 1995), their inability to release the ferment of innovation and learning that would be required to deal with the multiple causes of these over-determined problems--and especially learning about the systems processes which regularly undermine well-intentioned public action, their inability to support a transformative adventure in which the outcomes cannot be specified beforehand (see also Jackson, 1986), and their inability to initiate comprehensively evaluated experiments and change them in the light of the evaluations. The interactions between these components are mapped in Diagram 23.1.



* Intervention in these cells would help change the nature of the qualities nurtured and rewarded in the system. Motives which could be harnessed to do this are marked (M).

† These need to be replaced by acceptance of the need to make managed economies work—to find ways of giving effect to information concerning the public long term interest, the need to explicitly create variety and information on the personal and social consequences of the options, and to find ways of holding public servants accountable for, and getting them to act in, the long term public interest. This means systematic, broadly-based, evaluation and participative democracy.

It shows how the narrow nature of educational provision is heavily over-determined and demonstrates why it has been so difficult to introduce change in education. The effects of any single change are negated by other forces and predictable reactions produced by the overall system of forces. As a result, “common-sense” reform does not work. While indicating the motives which might be harnessed to produce educational change, the diagram also shows the difficulty of linking those motives to the points at which systemic interventions might be targeted.

In more detail, the diagram shows:

1. That the narrow educational activities which dominate schools are produced by: (i) a series of sociological imperatives (e.g., that schools assist in legitimizing the rationing of privilege); (ii) inappropriate beliefs about the nature of the changes that are needed in education itself, the management of the educational system, and the management of society; (iii) failure to initiate research which would yield useful insights into such things as (a) the nature of competence and how it is to be fostered and (b) how to manage the educational system to nurture high-level generic competencies; (iv) the absence of (a) systematically generated variety in, and choice between, educational programs which have demonstrably different consequences and (b) information on the consequences of each of these alternatives; (v) failure to introduce “parallel organization activity” to produce innovation within schools, and (vi) inadequate dissemination of the results of research into the nature, development, and assessment of generic high-level competencies, and, especially, the implications of the values basis of competence.
2. That this narrow educational process has a series of knock-on effects which finally contribute to its own perpetuation. The competencies and beliefs that are nurtured and inculcated in schools reinforce a social order which offers major benefits to “able” people who do what is required of them without questioning that order; it creates endless work which gives meaning to people's lives (but does not enhance the general quality of life); it creates wealth at the expense of the biosphere, future generations, and the third world; and it protects its citizens from a knowledge of the basis of their wealth. The educational system helps to teach a host of incorrect beliefs which collectively result in nothing being what it is popularly or authoritatively said to be (for example, the educational system itself claims to be about promoting the growth of competence when it in fact mainly operates to engage vast numbers of people in “teaching” and “learning” activities of little educational merit but which ensure that those who are most able and willing to challenge the fraudulent nature of the system are routed to social positions from which they can have little influence while those who are least able to do anything except secure their own advantage are promoted into influential positions in society). This double-talk makes it extremely difficult to conduct any rational discussion of the changes needed in society. The sociological imperative that schools help to legitimize the rationing of privilege helps to create a demand for, and encourages acceptance of, narrow, invisible, and mislabeled

assessments. Those predisposed to acquire these “qualifications” are not inclined to see the need for, or to commission, genuine enquiry-oriented research or notice other talents in their fellows. Teachers who discover the hidden competencies of their “less able” students experience acute distress. The lack of understanding of the nature of competence leads to a failure to underline the need for a variety of value-based educational programs and thus to the perpetuation of narrow educational activity.

3. That the main motives for change are widespread awareness that there is something seriously wrong with the educational system, and, more specifically, that it fails miserably in its manifest task of identifying, nurturing, recognizing, and utilizing most people's motives and talents. The most commonly proposed solutions to this problem, based as they are on other misunderstandings, are, however, inappropriate. Another motive for change is that there is increasing recognition that we have created a non-sustainable society and that basic change in the way society is run is essential.
4. That there are a number of points at which it should be possible to intervene in the feedback loops to create an upward spiral. These involve: (i) promoting wider recognition that one cannot get value for human effort in modern society unless we introduce better means of monitoring and evaluating the long-term effects of what we are doing and better ways of giving effect to information on such effects. This points to the need to change the way we run society, to the need to introduce more, and more appropriate, social research and evaluation activity, and to find ways of holding public servants and politicians accountable for seeking out and acting on information in an innovative way in the long-term public interest; (ii) introducing the “parallel organization” activities that are required to promote innovation within schools; (iii) establishing a greater variety of distinctively different, value-based, educational programs and providing information on the short and long-term, personal and social, consequences of each; (iv) creating public debate about the forms of supervision--the nature of the democracy--needed to ensure that public servants seek out and act on information in an innovative way in the public interest and, (iv) disseminating what is already known about the nature, development, and assessment of competence and its implications.

Implications for the Role of the Psychologist

In developing this map, we have attempted to follow the injunctions of House (1991), Parlett (1972, 1976), and Hamilton et al. (1977) to use psychological data to illuminate the hidden network of social forces which overwhelmingly determines our behavior and our theories. Many readers will claim that, as psychologists, we should not have done this or that we have “gone way beyond our data” in doing it. Yet, if we, as psychologists, wish to claim either to be serious students of the determinants of behavior or that we aspire to the application of our science to

benefit society, there is no doubt that we need to take the study of such forces seriously⁵. They do, indeed, strongly determine human behavior, they are to be illuminated by using psychological data in appropriate ways, and the only way to intervene in them is by adapting the results of psychological research into effective organizational arrangements and human competence and using it to develop new organizational arrangements and information-based management tools.

But we will not engage with this task if we continue to work within the constraints and shared images of the role definition that we have accepted in the past. We need to actively articulate and promote a new role for ourselves.

The Wider Context: The Destruction of Life on Earth

There is not space in this article to develop in any detail the claim that the autopoietic system we have mapped for the educational system is part of a wider autopoietic system that is heading our species toward its extermination carrying all known life with it.

Yet it is now widely recognized that we, as a species, are heading toward our own extinction (Oskamp, 2000; Stern, 2000; Raven, 2001d; Anderson, Douglas, Holmes, Lawton, Walker, & Webb, 2001). Although Oskamp cites numerous trends that are accelerating exponentially out of control, the most striking is Wackernagel and Rees (1996) demonstration that it would require five back up planets engaged in nothing but agriculture for everyone alive in the world today to live as Americans do.

There is a strong tendency to attribute this plunge of homo-sapiens toward self-destruction, despite widespread recognition of the need to radically change the way we live, to the doings of evil capitalists. Yet our work on the educational system shows that the process has too many components to support the view that it has been designed by an evil elite. What is most striking is that the system has evolved further and further along its current trajectory despite the repeated demonstration that the vast majority of pupils, parents, teachers, ex-pupils, and employers want it to move in exactly the opposite direction.

This claim parallels that offered by Galbraith (1992) in his quest for an explanation of the great financial crash of 1929. A search for evil people on whom to pin the blame gets us nowhere. What one sees in the great crash is the cancerous growth of an emergent autopoietic system which no one can see how to stop until the system as a whole collapses. Morgan (1986) has developed a socio-cybernetic diagram for inflation more generally ... and shown that there *are* a number of negative feedback loops which could be amplified to damp the system down.

⁵ In this context it may be helpful to note that, although once ridiculed for having made unjustifiable leaps of logic, geologists these days would have no hesitation in inferring from the existence of such apparently disparate things as terminal moraines and hanging valleys that the area in which they occur must once have been glaciated.

I have elsewhere (Raven, 1997; Raven & Stephenson, 2001) developed a socio-cybernetic map of the processes that are driving our whole society, against our will, toward our self destruction, but to introduce it here would be to raise questions which would take us far beyond the scope of this paper.

The Way Forward: An Analogy

In considering what needs to be done to get out of the messes we are in it may be helpful to pursue an analogy from physics.

Prior to Newton, if things moved it was because they were possessed of animal spirits ... they were *animated*. Likewise, prior to Newton, it was impossible for sailing boats to sail into the wind. Newton made three crucial observations: (1) If things moved (or changed direction, or stopped moving) it was because they were pushed or pulled; (2) To every force there is always an equal and opposite reaction; the problem is to identify it, and (3) The forces acting upon a body can be resolved into orthogonal components.

The first of these implied that the wind was not animated. Instead of praying to the gods for a favorable wind, one should set about trying to harness the relevant forces to do useful work instead of allowing them to crash our boats against the rocks.

The second observation implied that there must be somewhere an equal and opposite force to the wind. A quest to identify that force led to its being found--unimaginably--in the sea. And a search for ways of harnessing that force led to the addition of keels to sailing boats.

The third observation led to the realization that the opposing reactions of the wind and the sea could be resolved into a component pushing, if not directly into the wind, at least in a direction which enabled one to tack into it.

These remarks imply that the first thing we have to do is to de-animate the forces that are driving us to destruction. We have to stop blaming (and wringing our hands about) the capitalists⁶. Instead, we have to see them as *expressions* of a network of hidden forces. They are selected and promoted and behave as they do because of those forces. What is more, people who behave in ways which resemble the behavior of capitalists are not few in number but pervade our society. Then we have to identify those forces. And, after that, take steps to harness them. A relatively naïve suggestion (which nevertheless illustrates the point) is that including measures of a wider

⁶ Readers might be forgiven for imagining that this would have been the central task of sociology. Unfortunately, just as many psychologists have been blinded by naïve theorizing, so most sociologists have been prevented from engaging in any serious enquiry by a bastardized form of Marxism. The collapse of the Eastern bloc is widely--if incorrectly--thought to discredit Marxist analysis in general and not just the bastardized version of Marxism that has been mentioned. Unfortunately, this collapse has led to the abandonment of even those feeble attempts that existed within the field to clarify and map the processes we are concerned with here.

range of the outcomes of education in the certification and placement processes used by schools would drive schools towards doing the things we want them to do rather than away from them.

But beyond the developments that depended on the work of Newton and others--that is to say on classic academic inputs--developing a relatively safe network of sailing boats also depended on the emergence of a complex socio-cybernetic system: It was necessary to accumulate a library of charts, to evolve sextants and chronometers so that one could know where one was, to erect lighthouses, to develop means of paying lighthouse keepers, and so on and so on.

Parts of this system evolved relatively naturally, but other parts--such as the development of chronometers--required enormous purposeful public investment.

There is one other point to be drawn out of this analogy. Many have asked "Are we strong enough to fight these dominators; these capitalists and politicians?"

This is analogous to asking "Are we strong enough to fight the wind?" It is the wrong question. What we have to do is to understand and to map the relevant socio-cybernetic systems and then use our insights to develop alternatives. As numerous scientists have discovered over the course of history, the personal costs of challenging conventional authority can be enormous. But collectively--and with superhuman individual contributions--it was accomplished. To us now falls the mantle of carrying the process forward. We, as psychologists, need to set about bringing into being the kind of paradigm shift that was brought about by Newton and his colleagues. It demands classic academic activity. But we also need to initiate and contribute to the wider developments that are required to evolve a more appropriate socio-cybernetic system to manage society.

Mapping socio-cybernetic feedback loops has proved a daunting task. Despite the work of Morgan (1986), improving on Diagram 23.1, depicting the forces that are contributing the elimination of the species and the destruction of the planet, and clarifying how to move forward has proved difficult indeed (see Raven & Navrotsky, 2000). Certainly it has not proved as easy as either Morgan or Navrotsky suggested to identify the negative feedback loops that damp down the operation of the system with a view to amplifying them in order to bring about desired changes.

Developing a specification for an alternative socio-cybernetic system for the management of society is a still more daunting task. When discussing the results of our attempt to map the interlocking network of feedback loops that perpetuate our dysfunctional educational system I mentioned, although I did not elaborate the point, that, if we are to move forward, we need to design a better public management system for society, that is to say, to design new forms of public management that will operate in the long-term interest of the general public instead of in the short-term interests of dominators.

A specification for that design can be found in the work of Adam Smith and Fred Hayek. In essence that specification laid out the need to design a societal management system which worked without anyone having to know anything very much; one which would not depend for its effective

operation on dominators or “wise men” because, essentially, the key knowledge required to be wise--knowledge of what will happen as a myriad of current developments come together--cannot be available to anyone. In other words, an acceptable design must be non-authoritarian and encompass many interacting feedback loops. There is not space here either to show that our current societal management system--although often described as a market management system--actually operates in entirely the opposite way; that we live in a managed economy in which the function of money has been reversed. Instead of providing an “invisible” management system, the control of cash flows and the determination of prices is used to achieve goals determined by the trans-national corporations and through the politico-bureaucratic process. Nor is this the place to show why Smith and Hayek’s market solution does not and cannot work (Raven, 1995). And neither is this the place to outline the new arrangements that are required in any detail (described in Raven, 1995). But at the heart of the requisite new arrangements--this designed socio-cybernetic system--lie new forms of bureaucracy and democracy ... new organizational arrangements about which psychologists (following the work of Kanter, 1985 and Schön, 1973, 1983, 1987) should have much to say. And new job descriptions and appraisal systems for public servants. In other words, the development of a new socio-cybernetic system for the management of society depends centrally on the application of the concepts and methods of organizational psychology to the running of society.

But there is one more, somewhat paradoxical, thing to be said. Proceeding as we have suggested here essentially involves turning psychology inside out. It means de-animating human behavior and, in a sense, attributing behavior to the hidden social forces that act upon us. Of course that is an over-statement because we have spoken of the role of these forces in selecting and promoting certain sorts of people. Nevertheless there is something of an irony in suggesting that the way forward involves promoting the use of psychology to depsychologize human behavior.

Conclusion

If we have seen anything in this paper it is that our behavior, even the scientific paradigms we adopt, is heavily determined by a network of socio-cybernetic forces which, as students of behavior, it would behoove us to seek to understand and, as normally ethical human beings, it would seem that we have a responsibility to seek to develop the tools needed to influence. *Without* such activity, much of our other work must be considered incompetent, lacking in objectivity, and unethical. Unless we accept the kind of action indicated by these observations, it would not be inappropriate for members of the public to initiate legal proceedings against our profession with a view to having our charters revoked.

We have also seen that there is every probability that the network of social forces that directs and constrains our behavior is linked to a wider network that is driving toward, not merely the extinction of our species, but all life known to us.

More specifically, it would seem that the relationships so strikingly portrayed in Gottfredson's paper have come about, not because they contribute to a getting useful work done in an effective way for the benefit of society⁷, but for precisely the opposite reason: They contribute to a network of myths, thoughtways, hidden social forces, and actions which obscure and render invisible the processes actually at work--and those processes result in such destruction of the planet that its very survival is in jeopardy.

⁷ Jaques (1989) has also commented on the irony that we have, on the one hand, devoted enormous effort to finding ways of legitimizing differentials in pay and prestige and very little to thinking about how to get work done effectively and, on the other, of holding subordinates accountable to their "leaders" and very little to finding ways of holding "leaders" accountable to their followers.

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