



Chapter 19

Intelligence, Engineered Invisibility, and the Destruction of Life on Earth*

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Abstract

Gottfredson (1997) assembled a huge amount of data supporting three main claims: Out of all the traits known to psychology, only **g** predicts much of the variance in occupational performance; **g** is the most important of all the variables assessable by psychologists determining the effectiveness of behaviour outside work; and occupational status depends mainly on **g**. In this article it is shown that, in both the workplace and educational system, other qualities besides **g** are important but remain invisible. This invisibility is produced by a network of interacting, but mutually supportive, processes which include the adoption of an inappropriate psychometric model and limited criteria of performance, but, most importantly, from what seems to be a sociological “need” for a single and unarguable criterion of merit to legitimise a social hierarchy which contributes enormously to the network of forces which result in most people spending most of their time contributing to activities which are, directly or indirectly, destructive of other people’s quality of life and the chances of our species and the planet surviving – that is, to activities which can only be regarded as highly unethical. Embracing the task of mapping these socio-cybernetic forces results in focussing on the external rather than the internal determinants of behaviour. Trying to map these forces has enabled us to outline arrangements which should make it possible to run the educational system—and other domains of human

* An earlier version of this paper has for some time been available at WebPsychEmpiricist: http://www.wpe.onfo/papers_table.html





endeavour—more effectively. These developments depend quintessentially on organisational arrangements, job descriptions, and appraisal systems the development of which falls clearly within the domain of organisational psychology.

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 utilises only tools developed within the traditional measurement paradigm, focuses mainly on conventional criteria of job performance, and accepts assumptions about the functionality of hierarchical organisation of workplaces and society.

Next, it is argued that all of these things—failure to recognise, develop, and utilise 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. Nurturing the competence to understand and intervene in the networks of invisible social forces that overwhelmingly determine our individual and collective behaviour is therefore an activity of the greatest importance.

More than that, from a scientific point of view, it is 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 by using psychological data to illuminate the hidden social processes that are at work.

What then emerges is that these neglected *external* forces are among the most important determinants of behaviour. To move forward in psychology, we need a paradigm shift as great as the Newtonian shift from attributing movement to the internal, “animistic”, properties of moving bodies to accounting for it largely by reference to networks of invisible external forces.





Finally, it is shown that even a preliminary understanding of the socio-cybernetic forces controlling the operation of the educational system enables us to design an alternative management system which would make it possible to run the system in such a way as to achieve its manifest goals more effectively. The requisite design would in fact be almost the exact opposite of that which informs most of the policies currently being pursued worldwide. Implementing that design is crucially dependent on psychologists developing new specifications for the requisite organisational arrangements, new job descriptions, and new tools for organisational and staff-appraisal.

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 setting—is 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 these assembled data are, they are not entirely convincing.

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

As argued in greater detail elsewhere (e.g., 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 *Behavioural Event Interviewing* (a variant of Flanagan's *Critical Incident Technique*)—it has been shown that effective organisations call on even their “low-level” employees (lavatory attendants, machine operatives, sales people, etc.) to utilise high-level competencies. For example, a compilation of “effective” behaviours observed among machine operatives included examples of them studying the way the overall system of which they formed a part functioned and working out for themselves what they should be doing—and doing it without having to





be given instructions. But, as researchers like Kanter (1985) and Schon (1983) have shown, even this behaviour is gross compared with the diverse subtle contributions that people in effective organisations make to the emergent properties of problem-identification-and-solving networks which, while crucial to the improvement and survival of the product, services, and organisation itself, are rarely discussed.

Yet this fact cannot show up in studies grounded in correlations between psychological tests and job performance. This comes about, in part, because the classical test armoury, 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. These contributions and effects cannot be easily identified using conventional methodology such as performance ratings.

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 most researchers, often fails, because of the culturally determined associations that are evoked when one is asked to describe incidents in which people have been observed doing something considered to be particularly effective, to reveal the full extent of such contributions. As Adams and Burgess (1989) have shown in their work in schools, these associations make it unlikely that people will record incidents in which others did such things as resolve “personal” conflicts between colleagues or wrestle in private with a conceptual problem and then pass the solution on to someone who would do something about it. Yet, as both they and Kanter have shown, such activities are crucial to the creation of the cultures of intelligence or enterprise that are required for organisational 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, 1977, 1985). In the course of this research (which was carried out in both elementary and secondary





schools) we observed that, as described below, 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.

To give but one example: in one elementary school (Raven, Johnstone, & Varley, 1985), we found the pupils engaged in a project designed to get something done about the pollution in the local river. The project, its organisation, 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 analyse 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 familiarise themselves with a new field, and the ability to find ways of summarising 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 publicise 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.

It is extremely important to note that what was happening here involved making *descriptive statements* about each individual pupil's talents and areas of knowledge and expertise. Despite the assumptions which many of those who have grown up in the current climate of assessment bring with them, this could not be achieved by trying to arrange them on scales because a *different* set of scales would be required to record the talents of each child. To help readers get the point, it might be useful for them to try to imagine seeking to describe chemical substances in terms of profiles of ratings across each of the 96 elements. Huge amounts of useless information would be generated and the process would still fail to reveal the emergent properties that occur when different elements combine. It is what people are good at, and their idiosyncratic expert knowledge (mostly non-verbalised and consisting of knowing-how rather than knowing-that) that we need to record. To do this effectively we will need to develop a framework of agreed descriptors akin to that employed in chemistry. So far, as will be seen in the next section of this paper, all we have is a basis on which such a framework could be built.

Particularly in an American context, it is important to emphasise 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, 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 publicised 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 behaviour 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 those concerned to construct something “creative” out of a collection of toy bricks.

Conclusion to Part I

It follows from the material briefly summarised 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 schools, workplaces, 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 talents.





As it happens, Spearman (1926) had noted both the problem and the direction in which its solution should be sought almost a century ago. He noted 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.” 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 that lacked both construct and predictive validity². The low reliability of the tests used in the educational system is well known (see e.g. Black, 1998; Spencer, E. 1983) as is their inability to predict anything much outside the educational system (see e.g., Schmidt & Hunter, 1998). But the point being made by Spearman and the author (e.g. Raven, 1991) is more basic. The tests lack *construct* validity. There is, for example, no sense in which the typical “science” test used in schools assesses the competencies of the scientists observed in the project work discussed above or even testifies to knowledge of a sample of the “basic” information and procedures that constitute the domain of “science”. The second thing that Spearman noted was that the “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 or to develop from latent or rudimentary existence”, 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 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: Ways in Which Widely Accepted Assumptions in Psychology Contribute to Invisibility

1. *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 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 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 sulphur. Can one doubt that those whose task it is to remove dents from damaged cars “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. Different people are preoccupied with “thinking”, usually non-verbally, about very different things. On the basis of the limited evidence already reviewed, it also seems a reasonable hypothesis that 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.

If one can generalise from these examples (and evidence suggesting that one can so generalise has been brought together in Raven [1984/1997]), it would seem 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 meaningfully assessed in the way the currently dominant paradigm suggests, that is, they cannot be “measured” by presenting everyone with a common task and seeing how “well” they do, because this will fail to tap and unleash *most* people’s ability to do these things. As shown in more detail in Raven and Stephenson (2001), 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 it happens, a procedure that operationalises this model was developed by McClelland and his colleagues in the middle of the last century (McClelland, Atkinson, Clark, & Lowell, 1958; but see Raven & Stephenson, 2001 for a re-interpretation). Those being assessed were asked to make up stories about what was happening in ambiguous pictures. They were asked to say what each of the characters in the pictures was thinking, feeling, and doing and what the outcome would be. To score the stories the psychologists concerned first asked “With what kind of activity does the person who wrote this story seem to be preoccupied?” Then, in relation to this kind of activity, and only in relation to this kind of activity, they then counted up how many of a number of different kinds of action that would potentially enable someone to undertake his or her chosen activities effectively the author imagined his characters displaying: Did they turn their emotions into the task? Did they make plans, anticipate obstacles, and seek ways of tackling those obstacles? Did they seek the help of others? Did they persist for a long period of time? It is vital to note what is going on here. This is no internal-consistency-based measure of “achievement motivation”. Rather the resulting score is more like a multiple regression coefficient predicting the probability of success in undertaking an intrinsically motivating activity (with each of the individual predictors assigned the same weight). Unfortunately, even those who developed this scoring system did not recognise that what they had stumbled upon was, in reality, a radically new paradigm for the assessment of competence. Instead they presented it as a means of assessing “personality”³. Thereafter, in the half century that has intervened, McClelland and his disciples, in their quest for acceptability among their peers and a market for their products, largely abandoned it and came to accept and promote the classical measurement framework (see Raven & Stephenson, 2001, for a discussion of this process).

2. Problems with the accepted procedures for test validation.

When one turns to popular notions about the procedures that are appropriate for test validation, one encounters similar problems. In the workplace, people are not usually doing what other people think they are doing. As a whole series of studies, some of which have been brought together in Raven & Stephenson (2001) and Spencer and Spencer (1993) have shown, one manager is preoccupied with advancing himself in his career by running a “lean, mean” organisation 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.

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, as Messick (1995) and Raven et al. (1998) have argued, one cannot “validate” tests in the manner prescribed in most textbooks. 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.

3. 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 behaviour, and the effects of their actions 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 organisations is almost entirely dependent on what takes place in what Kanter terms “*parallel organisation*” activity. During the time devoted to such activity, people come together in networks 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 organisation are rendered inoperative. It is these invisible and idiosyncratic contributions to such emergent properties of groups as might be referred to as “climates of enterprise” that are important. How can such observations not undermine the seeming strength of Gottfredson’s thesis?

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 sulphate cannot be predicted by adding the individual properties of copper, sulphur, and oxygen, and those three substances are not recognisably “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.

4. *Psychologists have accepted a great deal of sloppy thinking about “scientific methodology”.*

One network of beliefs supporting the hegemony of a measurement paradigm that renders many important human qualities invisible is associated with the concepts of “objectivity” that inform the recommendations of such professional bodies as the Joint Committee on *Standards for the Evaluation of Educational Policies and Programs* (1981). This particular committee recommended that only reliable and valid tests should be used in the evaluation of people and programmes. Apparently reasonable though this recommendation is, its *effect* is to render many important personal qualities and the effects of policies and educational and social activities invisible. Since there are no good measures of the main objectives and outcomes of the kind of interdisciplinary, competency-oriented, enquiry-based, education discussed earlier, the requirement that only reliable and valid tests be used in its evaluation induces researchers to use only *irrelevant* tests. This not only renders the positive outcomes of these activities invisible, it also ensures that many negative effects of conventional educational activities go undetected and undiscussed—indeed almost undiscussable⁴.

The overall effect of this process is to undermine any claim to objectivity or scientific competence on the part of those concerned. In reality, such evaluations—whose main fault is a lack of *comprehensiveness*—must be considered, not only incompetent and lacking in objectivity, but also unethical. This is in part because they contribute to the process whereby most children’s talents are rendered invisible and undeveloped thus contributing to the processes through which schools damage most children and their future lives and careers. But most importantly it is because these neglected talents are the very talents that are required to transform the way we live in such a way that our species—and indeed the planet as a whole—will have a chance of survival.





Part III: Ways in which Invisibility is Driven by Wider Social Processes

Having examined the contributions to the invisibility of many important components of competence that stem from assumptions or axioms arising within the discipline of psychology itself, we now consider the role of some wider social processes that seem to at work.

1. Processes operating in schools.

Most educational activity of the kind discussed has been purged from schools in the UK. This has been achieved by insisting that all pupils follow the “national curriculum” (which, in many areas, prescribes the activities teachers are to undertake on a week by week, and sometimes minute by minute, basis) and take the same tests. This has the effect of inducing teachers to pay more attention to the prescriptions of authority than to the needs of their pupils, thus rendering the other talents their pupils possess even more invisible.

Our question here is: “What has driven this process?”

The most common justifications have to do with such things as eradicating “poor” teachers, facilitating the movement of pupils between schools, and improving the fairness of the procedures used to allocate position and status in a meritocracy.

But more disturbing reasons come to light as one reviews what the educational system actually does. The very least one can say is that – unlike the interdisciplinary, competency-oriented, project work discussed earlier – most of what happens in most schools amounts to a charade of little developmental or societal value (whilst conferring enormous social benefits on a minority of the participants and assigning others to lives of degradation and humiliation at the hands of the welfare “services”). This is revealed by five related observations⁵:

- a) The activities which dominate most schools have little developmental value (see e.g. for schools Goodlad, 1983; Raven, 1994, for universities Murphy, 1993; Steiner, 1999);
- b) Most of the tests that are used to evaluate educational performance testify to little of merit because they lack construct validity (see above);
- c) These tests have little predictive validity outside the “educational” system (see Schmidt and Hunter’s 1998 meta-analyses);





- d) What is learned in schools rarely helps people to cope with their jobs and lives (see e.g. Bachman, O'Malley, & Johnston, 1978; Flanagan, 1978);
- e) Most of 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, will be forgotten by the time it is needed (Raven, 1994).

Nevertheless, many authors have suggested that schools, while failing to nurture competence, may nevertheless, especially through the “hidden curriculum”, teach some sociologically very important lessons. For example, Goodman (1962) suggested that they may teach pupils to be subservient to authority and to be willing to accept that those in higher positions know more about issues of concern than they do. Willis (1977) assembled data supporting the hypothesis that one of the primary functions of schools is to inculcate a willingness to tolerate boring work. And the author (see Raven & Stephenson, 2001) has suggested that the only conclusion one can reasonably draw from the available literature is that the system teaches people that others have the right to define who one is, what one is good at and bad at, and to allocate one's position and status on the basis of criteria they have determined. They may also teach people to abdicate responsibility for taking control over their own lives and for trying to influence what happens in society.

Still others have suggested that some of the things that are done by schools have direct sociological effects. Thus Jencks et al. (1973), in addition to producing considerable evidence supporting the view that one of the major functions of the system is to “legitimise the rationing of privilege” (by promulgating the myth that those who are advanced in it are the most “able” whilst those who are demoted are “unemployable”), also showed that its main function was to sort people into a social hierarchy. Observation of the de-humanising treatment meted out to those who fail to compete in this norm-referenced hierarchy then induces others who would prefer to drop out to persist. Jencks' main conclusions have since been strongly supported in the extensive studies of Hope (1984). The norm-referenced allocative (as distinct from competence-certifying) function of educational qualifications is also strongly confirmed in the previously mentioned work of Steiner (1999) and Murphy (1993). What they show is that there has in fact been little change in the competencies needed by the workforce over the years, yet everyone has to spend





more time in the so-called educational system, and accumulate more certificates, in order to get to the same place in the occupational hierarchy: The majority of US graduates now end up as maids, retail sales persons, or janitors. On the basis of his observations as a University Principal, Nuttgens (1988) suggested that one of the main functions of the system must be to “promote those who are least able to do anything” into influential positions, and McClelland (1961) showed that the system does, indeed, tend to squeeze out those high in *need* Achievement. Tomlinson and Tenhouten (1976) showed that primary schools promote a disproportionate number of those who are most willing to do whatever is necessary to secure their own advancement regardless of the ethical implications that so doing may have. They suggested that such individuals may have an important role to play in a society largely composed of a network of fraudulent systems which, like the “educational” system itself, fail to deliver what they claim to deliver and that what those concerned were actually doing was conveniently obfuscated by the educational system having denoted them as “highly able”.

If such claims were true (as they probably are), one would be left with a very strong feeling that the forces Kuhn argued lay behind the hegemony of particular scientific positions (in this case the hegemony of the single-factor model of “ability”) are not the only process at work here but are supported by some very strong sociological requirements that are perhaps only too apparent to those in positions of authority. Put more strongly, instead of, as Gottfredson would have us believe, promoting the most able, one of the latent functions of a single-factor model of “ability” could well be, not merely to “legitimise the rationing of privilege”, but to satisfy a sociological “need” for a single and unarguable criterion of merit to legitimise a social hierarchy which contributes enormously to the network of forces which result in most people spending most of their time contributing to activities which are, directly or indirectly, destructive of other people’s quality of life, and the chances of our species and the planet surviving – i.e. to activities which can only be regarded as highly unethical⁶.

If that were the case, it would forcefully raise the question of how these social forces come to exert their influence.

These suggestions and this question behave us to examine the way in which multiple-talent educational programmes 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 *out* of schools. One example was John Major's announcement that "As from tomorrow, there will be no more 'play schools'. All children will be sitting in rows facing the teacher and being taught". This drive to eliminate "open" or "progressive" education has not been limited to the state sector. It has been accompanied by a vehement campaign to undermine 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. OFSTED's attack on Neill's *Summerhill* – which later turned out, as a result of an almost unique court action, to have been almost entirely fraudulent (see Stronach, 2003)–is but one of many that have, for lack of money, remained publicly unchallenged.

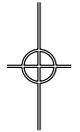
It is of interest that these developments followed a much earlier, but nevertheless very revealing, standardising "development". For some 15 years starting from the early 1960s, committees of the Schools' Council for Curriculum and Examinations in England and Wales debated the desirability of establishing 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. That committee (Waddell, 1978) observed that pupils had a huge variety of different talents and that these could only be fostered through very different types of educational programme. 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 programme 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 diversity of examining boards which would each promote a wide variety of courses covering different content, aiming at different goals, and assessed using different forms, or "modes", of assessment which would make it possible to give students (and thus their teachers) credit for having developed such qualities 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 proposals it had made for arrangements to promote and cater for diversity. How can the results of educational processes designed to nurture the ability to problematise, collect data,





and influence others be expressed on the same scale as the outcomes of a programme designed to inculcate the received wisdom about 18th century English history? One can only conclude that the sociological need for a single and unarguable criterion to legitimise the allocation of position and status – and with it a whole social system for rationing privilege–had somehow over-ridden educational and occupational considerations.

The examples so far given of the, largely hidden, drive to eliminate multiple-talent, competency-oriented, education are accessible in the literature. But there are many, on the surface individually amazing, examples in the (so far as I know) as yet unwritten history of teachers' attempts to bring education into schools. I have been urged to refer to more of them here. But there is a problem—and it is not just space. What happened to any individual project is largely known only to one or two people who were closely associated with it. And those people were not associated with other projects which—at least on the surface—suffered a similar fate. So, until someone systematises what happened all I can do is cite individual examples known to me ... and the resulting text seems out of character with the rest of this article. Nevertheless, a few examples must be given. Some relevant projects were associated with the, largely teacher controlled, Schools Council that has already been briefly mentioned. Many of its major curriculum projects disappeared for reasons known only to a few close associates. I know at least part of the story about what happened to its Integrated Science project, which was deliberately closed because it was both encouraging pupils to think about what they were doing and ensuring that they could get credit for so doing in the examination system. I am told that a similar fate befell the Humanities Project, MACOS, and a related mathematics project. These processes were by no means limited to the UK. At much the same time, the US office of Economic Opportunity—*not* the Office of Education—initiated Headstart and Follow-Through with a view to allowing thousands of sponsors to initiate projects based on their own theories about the causes of the range of problems known to be associated with social and economic disadvantage. Some of these were enormously successful in producing change (see Raven, 1980 and 1981 for a fuller account of some aspects of this work). This presented the evaluators (e.g. Stanford Research Institute) with a problem, which they set about trying to cope with. But then an apparently extraordinary thing happened. Control of the projects was wrested from the Office of Economic Opportunity and transferred to the US Office of Education. This promptly directed





the evaluators to pay no attention to outcomes other than raising IQ, school achievement, and staying out of trouble with the police. This had the effect of forcing most of the sponsors to abandon most of their objectives. But what it is most important to note about the remaining objectives is that, while laudable, they are norm referenced and, as such, logically unobtainable by a cross-section of pupils. IQs are by definition relative to the scores of other children in the same age group. One cannot have “most” children “above average”. And, as Hope (1984) also demonstrated, this particularly applies to “at risk” pupils. As soon as one moves some pupils out of “remedial” classrooms where they are “set up” to be in trouble with the police, their seats are taken by others. What one sees very clearly here is the role which the educational system, qua system (and not via the “hidden curriculum”) plays in contributing directly to the cementation of a social structure that has a range of knock-on effects and the willingness of authority to intervene in, and effectively destroy, the educationally-oriented activities created by people with a genuine interest in children, people, education, development, and humane ideals in society to ensure that these sociological functions are performed.

2. Processes operating in psychology.

The second set of reasons why so little has been done to act on Spearman’s insights may be that our society somehow “needs” a single and unarguable criterion of merit to operate as it does and, in particular, to enable it to progress 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 dehumanising 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 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, Tabor, & McIntyre, 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, 1984/1997), 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 organisational 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 organisational performance—and the reasons are revealing indeed.

But before turning to them we may note that, for 15 years, Schön and Argyris ... two of the most respected figures in occupational psychology ... were unable to modify the management-development programmes 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 behaviour 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 organisational 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 enrol?" 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 "privatise all services (including education) to the maximum extent possible". The effects can be expected to be nothing short of disastrous.

A re-formulation

The processes described above may be viewed as an outcome of, among other things, unthinking (or perhaps 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. The effect of this is to lead scientists not only to shy away from any attempt at *comprehensiveness* (claiming that it is unrealistic and "too difficult") but also to deny responsibility for examining consequences outwith those covered in the studies they have been commissioned to undertake. (The word "comprehensive" is here used to suggest an attempt to get a rough fix on *all* the effects of the experimental variation on *all* relevant outcomes.) The effect is to promote a vision of science which is both deeply unethical and lacking any form of objectivity worth the name.

Shiva (1998) has noted that the promotion of such a vision of science is somehow linked to the promotion of monocultures of mind





(in both education and in the range of scientific perspectives [theories] that are deemed acceptable), the promotion of monocultures in society, and to the promotion of monocultures in agriculture. The net result of the autopoietic⁷ system constituted by these interlinked processes 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

At least two things would seem to follow from what has just been said. First, instead of evaluating studies primarily in terms of the accuracy of correlations established between single variables, it would seem that the main index of quality should be *comprehensiveness*. Second, it would seem that we should articulate and embrace what may be termed an ecological image of science. In this, the dominant concern would be to study and map the multiple and interacting feedback loops, intermediary outcomes in, and diverse results of, any process we seek to understand and describe. Morgan (1986) and Raven (1994, 1997) have provided partial illustrations of what such work might look like. An appropriate name for such activity 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 to the study and design of guidance and control systems in society.

Socio-Cybernetics: An Illustration

I may again illustrate what I have in mind by reference to our work on the educational system.

However, by way of a preliminary comment, I must first emphasise that I do not deny the importance of many other contributory factors besides those on which I will focus. On the contrary, in contrast to what many educational philosophers would have us believe, our work has clearly shown that the effective implementation of individualised, competency-oriented, project based, enquiry-oriented education in group settings is just too difficult for most teachers without: (i) better ways of thinking about multiple talents; (ii) a better understanding of the procedures to be used to nurture those talents on a group basis; (iii)





tools to assist in the design and implementation of the individualised, competency-oriented, developmental programmes 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 their idiosyncratic qualities; and (v) means of giving teachers credit for their otherwise invisible educational accomplishments – and, especially, for nurturing among their pupils a wide range of diverse talents which could not possibly show up on any conventional test.

Nevertheless, our work has also revealed that many other processes are also at work. These have to do with the inability of public management systems in general 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 their inability to provoke 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 Figure 19,1⁸.

The Figure illustrates how the narrow nature of educational provision is heavily over-determined and demonstrates why it has been so difficult to introduce change in education. We are dealing with a *system*, or network, of hidden social forces which drive the system. The cumulative effect of these forces is that the system becomes self-perpetuating. 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 Figure also shows the difficulty of linking those motives to the points at which systemic interventions might be targeted. While pervasive, *system-oriented*, change is required, so many changes are needed in every nook and cranny of the system that there is no possibility of those changes being centrally mandated.

What happens is not determined by the wishes of parents, teachers, ministers of education or anyone else but, both directly and indirectly, by the sociological functions the system performs in society. One needs to take these sociological forces seriously and ask how they can be harnessed in the way that marine engineers harness the wind: They will not go away.

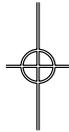
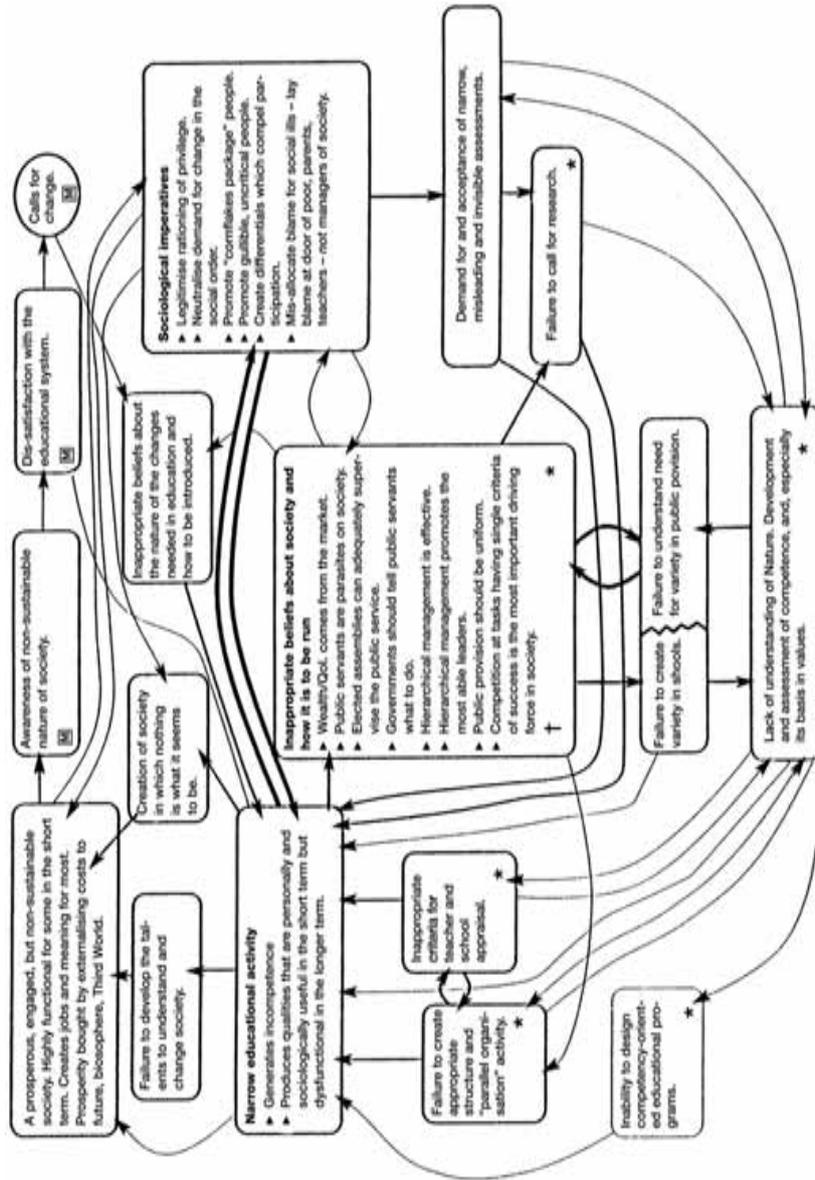


Figure 19.1.1 . Feedback Loops Driving Down Quality of Education





One effect of these forces is to *create* inappropriate beliefs about society and how it is to be managed—and these reinforce the operation of the system.

In more detail, the Figure shows:

1. That the dominance of the activities with which schools are preoccupied arises from:
 - (i) A series of sociological imperatives (e.g., that schools assist in legitimising 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) Society's 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 programmes which have demonstrably different consequences and (b) Information on the consequences of each of these alternatives;
 - (v) Failure to introduce "parallel organisation 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 legitimise the rationing of privilege helps to create a demand for, and encourages acceptance of, narrow, invisible, and mislabelled 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 become aware of 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 programmes 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, recognising, and utilising 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 stems from 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 might 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 organisation” activities that are required to promote innovation within schools;
- (iii) Establishing a greater variety of distinctively different, value-based, educational programmes 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 behaviour 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 behaviour 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 seriously⁹. They do, indeed, strongly determine human behaviour, 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 organisational arrangements and human competence and using it to develop new organisational 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 recognised that we, as a species, are heading toward our own extinction (Oskamp, 2000; Stern, 2000; Raven, 2001c; 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 is 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.

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 Illustration by 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.

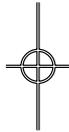
The first of these implied that the wind was not animated. Instead of praying to the gods for a favourable wind, one should set about trying to harness the forces which, up to that point, had simply crashed boats against the rocks to do useful work.

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 realisation 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 seen as driving us toward our self destruction. We have to stop blaming (and wringing our hands about) our leaders and the capitalists¹⁰. 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 our leaders and 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 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. (Such a development would be the equivalent of adding keels to sailing boats.)

But the development of a relatively safe network of sailing boats depended on many other things besides the classic academic inputs of





Newton and others. It also depended on the emergence of a complex socio-cybernetic system: It was necessary to accumulate a host of charts of the seas and the ports, to evolve sextants and chronometers so that ships' captains could know where they were on the high seas, 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 more 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 Figure 19.1, 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.

The requirements to be met by such a design can be found in the work of Adam Smith and Fred Hayek. One of the key observations they made was that, contrary to what almost everyone believes and assumes, the system should work *without* leaders deemed to be wise. The reason was simple, but devastating in its implications: *There can be no such thing as a wise man or woman.* The reason was again simple: the key knowledge required to take informed decisions – knowledge of what will happen as a myriad of current developments come together—cannot be available to anyone. Stated in one way this means that the system has to work without assuming that some person or group of people can know anything very much. As Smith and Mill repeatedly asserted, government decision-taking cannot be other than decisions by committees of ignoramuses. Put another way, the design specification is that the system must harness the expert information that lies in the heads, hearts, and hands of billions of people – hearts and hands because much of the information is not verbalised and consists of feelings and unverballed knowledge of how to do things. In yet other words, an acceptable design must be non-authoritarian and make provision for widespread experimentation accompanied by many interacting feedback (learning) loops. There is not space here 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 the basis for an “invisible” management system in which billions of people vote with their pennies on a myriad of issues, 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 to the design problem they correctly identified does not and cannot work (Raven, 1995). And neither is this the place to outline the new arrangements that are required in any detail (a fairly detailed sketch can be found in Raven, 1995). But at the heart of the requisite new arrangements—this designed socio-cybernetic system—seem to lie new concepts and forms of bureaucracy and democracy ... new organisational 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 organisational 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 behaviour and, in a sense, attributing behaviour 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 depsychologise human behaviour.

Summary and Conclusions



In the course of this paper we have seen that other qualities besides *g*, and especially the ability to contribute in one currently invisible way or another to group processes and the ability to understand and intervene in the external, social-systems, determinants of behaviour, *are* vitally important.

The invisibility of such contributions is produced in part by a network of interacting, but mutually supportive, processes which include deficiencies in our traditional psychometric paradigm and the procedures used to assess performance and also from assumptions about the efficiency of hierarchy. But, most importantly, it stems from the sociological need for a single and unarguable criterion of merit to legitimise a social hierarchy which contributes enormously to the network of forces which result in most people spending most of their time contributing to activities which are, directly or indirectly, destructive of other people's quality of life, and the chances of our species and the planet surviving—i.e. to activities which can only be regarded as highly unethical.

This observation prompts two more basic conclusions: (i) The *main* determinants of behaviour are external rather than internal; if psychologists wish to continue to claim special competence in relation to understanding behaviour, it will behoove them to pay attention to these external forces, and (ii) If psychologists wish to understand these social forces, and, in particular, to assist in the development of arrangements which will enable society to achieve its goals more effectively, then it is





essential to find ways of illuminating the socio-cybernetic systems that control the operation of society and to use this information to generate designs for more effective arrangements for the management of society.

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 society, 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.

From a practical point of view, the article highlights the need for better tools to help parents, teachers, and managers think about, develop, and utilise the vast array of talents that people possess and that are needed in society. It points to the need for a better understanding of the nature of developmental environments and the tools that are needed to organise them. But, most importantly, it underlines the need to develop more appropriate organisational arrangements, job descriptions, and organisational and staff appraisal systems for the various domains of policy—such as the educational system—that are required to run society in the long-term public interest. The development of these specifications and tools is quintessentially a task for psychologists¹¹.



Notes

1. Lester (2001) has delightfully argued that, despite almost universal acceptance of the contrary belief, *knowledge* is the one thing that that one *cannot* assess because it is largely idiosyncratic and tacit. Gottfredson (2003) has also drawn attention to the nonsense of Sternberg trying to assess “tacit” knowledge using tests of explicit knowledge.
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 problematise, conceptualise, locate relevant earlier work, familiarise 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 summarising data, and so 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. 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. Bluntly, they lack construct validity.

3. It is often asserted (e.g. by Weiner, 1992 and Snow et al., 1996) that these measures have been discredited. However, when one looks at the studies that are cited, one discovers that the operational definitions of the relevant constructs are entirely different to those deployed in the studies conducted by McClelland and his colleagues. One set, for example, uses the "Achievement Motivation" Scale of the Edwards Personal Preference Schedule. This is a Likert-type scale which essentially asks people how much they are attracted to a number of activities which might be viewed as being "achievement oriented". In no sense does it assess whether or not people are likely to bring to bear the cumulative and substitutable competencies that are required to carry out achievement-oriented activity effectively. Many of the measures used in the so-called validation studies are even more reductionist, consisting of such things as single (not even multiple) value-expectancy measures.
4. It may be useful to underline the full significance of this observation. What it means is that those studies that are widely used to support "evidence based policy" in education and "evidence based treatment" in drugs-based health care, psychotherapy, criminology, and agriculture in reality contribute precisely the opposite. They are the least scientific, objective, and ethical studies imaginable. By failing to report numerous, often disastrous, personal and social, short and long term, consequences of the policies and programmes being legitimised they contribute directly to the implementation of the unsupportable. And they do so under the guise of scientific respectability. This is why Shiva (1998) has argued that reductionist science contributes directly to monocultures ... not only in social culture ... but also in agriculture and in mind itself. Nothing could better illustrate the way in which various social processes, including the use of words to conjure up images that are precisely the contrary of what is actually referred to, combine to head us in a direction in which no rational person would choose to go.





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5. Although only one or two good studies are cited in each case, many more are reviewed in Raven (1994).
6. *Most* work in modern society is highly unethical. As spelt out in Raven (1995) it involves doing such things as:
- contributing taxes, research, or direct manufacturing activity to a war machine which not only directly takes the lives of hundreds of thousands of people each year but also consumes and/or destroys huge quantities of planetary resources in manufacturing or training exercises or as a result of dumping “waste products” arising from the manufacture or usage of nuclear and other weapons;
 - producing, marketing, or distributing junk foods, junk toys, and junk cars. The manufacture of these unnecessary commodities consumes enormous quantities of irreplaceable resources and generates waste which cannot be effectively disposed of. It therefore contributes enormously to the destruction of the soils, seas and atmosphere. Distributing them involves flying almost identical goods in opposite directions all over the planet and centralised distribution arrangements which depend on trucks, cars, and the construction of highways which also generate enormous pollution. Production also results in massive exploitation of labour and not only in “third world” but also at home. Marketing produces needs which cannot be satisfied and thus leads to debt and dis-satisfaction among huge sectors of the population;
 - offering junk education and junk research. Junk education fails to develop, and, as shown in this article, renders invisible, most people’s talents thereby denying them an opportunity to develop and use them. The neglected talents are those that are most important from the point of view of reforming our way of life so that the species and the planet have a chance of survival. The system also generates feelings of inadequacy in vast numbers of people and labels them as “unemployable”, suitable only for degrading and dehumanising treatment by the so-called “welfare” services. Junk research occupies the time of millions of people—and not only those directly involved in the research or in reviewing grant applications and the resulting publications, but also in building and maintaining the “necessary” buildings, printing presses etc.;
 - contributing to a drugs-based health care system that destroys all caring worth the name and diverts attention away from the societal reforms that are really necessary;
 - contributing to banking and insurance systems which are organised in such a way as to have the maximal effect from the point of view of sucking resources from the third world and exploiting—that is, destroying the lives and livelihoods of—billions of people and also reducing vast numbers of people in our own society to destitution, deprived of adequate communal care;





- contributing to energy-intensive chemicals-based agriculture whose effect is to destroy the soils, the seas, and the atmosphere as well as allocating billions of people to lives of degradation, humiliation and starvation.

In passing, it is important to note that those in the WTO and elsewhere who push through single-factor oriented educational reforms very clearly see the need to have a mythology and a social process which compels so many people to do so many things that they know to be wrong and, indeed, not even in their own best interests because the activities in which they are engaged destroy their own quality of life.

7. Autopoietic: from autopoiesis: A process whereby a system constitutes and maintains its own organisation.
8. Figure 1 merits detailed discussion which has had to be omitted here but can be found in Raven (1994, 1995).
9. 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.
10. 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 theorising, so most sociologists have been prevented from engaging in any serious enquiry by a bastardised form of Marxism. The collapse of the Eastern bloc is widely—if incorrectly—thought to discredit Marxist analysis in general and not just the bastardised 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.
11. I have long argued that we need to move toward what might be described as more ecological ways of thinking about human behaviour: Where would biologists have got to if they had sought to summarise all the variation between animals in terms of 1, 2, or 16 variables, the environments in terms of 10, and then study the interactions between them using multiple regression techniques? But, in reality, biologists have had enormous difficulties fending off every bit as reductionist approaches as those employed in psychology. This is nowhere more apparent than in simplistic assertions about evolution by natural selection and the determination of physical structures by genes. Biologists like Waddington (1969, 1975) have had a hard time of it. Not only are bodily structures determined by the interacting effects of multiple genes (and not single ones) they are also determined by what actually emerges in a particular environmental context in locations both proximal to and distant from any particular physical location at a particular point in time. Clearly, we need some continuously interacting





model of this sort to think about human development more generally so that we cease to assert that a causes b. And we need to generalise the same model even more generally when we come to think about the development of a society composed of multiple niches. In this context, my attention has been drawn to the work of Fischer (1998) and Thelen and Smith (1998). At this point in time, I can only say that, if biologists have had a problem fending off reductionist evolutionary theories and understandings of genetics, the task of generating procedures which will enable us to think about developments in society is even more daunting.

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