

Science In Transition: From science 3.0 towards Science 3.5.

For half a century I have been dissatisfied with the contribution of social science and philosophy to solving our social problems and tried to find out why. SIT's January agenda, its position paper and a plethora of articles give hope that something would be done about it. Frank Miedema's "Science 3.0" provides a ready-made overview for understanding the present structure of the problems of science and for defining what we are talking about. The purpose of SIT is to deal with them and move to - let us call it - Science 3.5 as sketched in his chapter "Real knowledge please", as a first step towards - who knows - Science 4.0. If I dare also tackle subjects for which I have no academic accreditation, it is because in certain cases that property (see Descartes) has proved an advantage (see below **A methodological practice**).

SIT's problems involve two major external actors: politics and the economy. Both rely on science for the facts involved in their decision-making. Politics is based on the kind of society we want to live in and this is - or should be - an essential factor in economics. So we must start with politics. **Political science** must produce 'real knowledge' that it is generally accepted as 'valid', meaning that - to the extent possible - it meets what Miedema and the position papers of SIT call the 'enchanted' view of science (Popperian, Mertonian, Kuhnian, I would add Lakatosian). As shown by Miedema (and others), the presumption that it always does so is an illusion, and a dangerous one. He ends with: "Will we be better able to explain bad science, bad pharma and fraud, and that it will happen more and more, by honestly explaining the system and its problems?" He fears that doing so will result in "a general distrust and loss of faith - and even nihilism - regarding modern science".

WHAT HAS TO BE DONE.

Selection and validation. What Miedema fears is already upon us. Plagiarism, fraud or other scandals that were exposed in our newspaper may cure us from the misconception that all scientists are saints serving the God of Science, but few people are that naïve. What really bothers the user is that, when he looks to science for an answer about a fact that he needs for his decision-making, he often is faced with various incompatible answers. A politician can almost always find a scientist who can provide him with 'scientific' arguments that support his proposal and/or undermines that of a competitor. In other words, **Miedema's book describes today's state of science. The 'enchanted view' is normative: it prescribes** what it takes for science to fulfill its job of supplier of 'real knowledge' about the facts engaged in our decision-making.

As with all human ventures, perfection is beyond our reach. (Popper's "Objective Knowledge", especially his lecture "on Clocks and Clouds", is a desperate, misguided and futile attempt to use science and reason as weapons against totalitarian aberrations.) Totally objective knowledge or science fully meeting the 'enchanted view' are beyond our reach. That does not imply that it is futile to do our best to come as close as possible and - if it has passed the appropriated tests - to accept the resulting knowledge as valid, as provisionally 'true', as science. All living systems, science, , are **open-ended**; optimal is not part of the language of life, and so is most science about them, especially social science and philosophy. A first selection consists in **elimination of what is not viable, is false.** If a proposition is incompatible with another proposition that has

been accepted as valid, then at least one of them must be invalid. If so, neither none can claim to be part of science until the contradiction has been resolved. Often the real cause of the incompatibility is that their propositions, while by them selves correct, are about different, and sometimes negatively correlated, aspects of the same object. The bone of contention often is not their validity, but their relative importance. The main cause of the above loss of faith is that these contradictions are rarely solved: the user mainly sees competing scientists, but little science. It is downright disconcerting to see how often statements of prominent academicians fail the test of axiomatization or contain other fundamental errors, which raises doubt about the quality or criteria of peer review. Worse, when informed they can and do ignore it. A second selection criterion may be their relative likelihood, Popper's verisimilitude, but that is far more complicated.

By a simple analysis of definitions and deductions, many statements, even of prominent academicians, can be exposed as failing the test of axiomatization and/or to sin against the rules of elementary logic. Axioms can be tested against factual statements that are generally accepted as valid. Besides reliable information, it will provide a basis for the above task of validation. Given the nature of living systems, especially a human society, it may be difficult, or even impossible, to resolve other kinds of conflicts in a conclusive way. Our prime objective must be to settle what **can** be settled, given the will to do so. Success will almost exponentially increase the stock of certified axioms available to settle the next bone of contention. The interests of the **users** of science (which includes scientists working outside academic programs) can only be given their due if at least some individuals make the required effort. And to obtain the necessary power, they must form a group. Appeal to that institution should be available to all scientists, whatever their affiliation or title, and regardless of their discipline. Other problems, like the four identified by Hans Radder, concern mainly the internal organisation of universities and are beyond the scope of this paper.

Integration. Miedema/Menand correctly see **compartmentalization** as a major cause of SIT's problems; it opens the door to bureaucratization and grants managers an almost unassailable position. Managers may be a nuisance. Bureaucratization is a real problem. With life sciences in general and social science in particular, compartmentalization is a fundamental fault, for it is incompatible with the 'holistic' (in its mathematical significance) nature of living systems: the conclusions of one discipline serve as axioms in others, and vice versa. The inert world can be apprehended by analysis and can rely on nature for selection (the collapsed bridge, the failed experiment). The living world in addition requires integration, and its conclusions – if any - are either 'invalid', couched in terms of likelihood or both. No wonder that Menand envies biomedical and technical disciplines.

Integration must become a common venture of all life-science disciplines by developing and applying generally accepted procedures and tools for selection and validation. Both integration and selection/validation require a shared language and would greatly profit from a global digitalized scientific dictionary/encyclopedia. Besides containing the definition of all words and all scientific theories and factual statements of social science and philosophy that are generally, if provisionally, accepted as valid, it should include their links to other statements in which they are used as an axiom. Definitions should be unequivocal and have a single empirical content for all empirical sciences and be freely accessible to everybody .

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The laws of physics qualify, as do the recent findings of molecular biology. In his 1970 book “Le Hazard et la Nécessité”, Jacques Monod has vulgarized them and explained their contribution to understanding the essence of life and the vital role and nature of the information process. Alas, one must conclude from their writings that most social scientists, and even some brain researchers, have not digested it. Therefore I had to start my book on democracy by 52 pages “Life and Information”. Whatever its merits, something of this kind must be available and mandatory reading for college and university students, certainly for philosophy and social sciences. It provides a rich supply of axioms that are valid and thus can form a growing basis for subsequent validation and integration.

A methodological practice in social science and philosophy seems to be the tendency that, when confronted with a new phenomenon, academicians start by consulting all that has been written about it; only then do they investigate the object or the theory of the statement itself. They often take the statements of prominent scientists as an axiom, thus blocking out other avenues of thought (see Descartes, and for instance in **Rawls’ contract theory of justice** (see “EXAMPLES”).

Many people were enthralled when Frans de Waal’s “Chimpanzee Politics” showed how similar their politics are to ours, and that, while chimps are capable of cooperation and empathy, in the end power prevails, as with us. Few asked the obvious question: “can politics based on competition and power (of the majority) be adequate for a human society?” Clearly the answer is no! The main strength of our human society lies in a level and variety of cooperation unmatched by any other living being. In today’s societies competition/power dominate over consent/cooperation, a ratio that is the cause of many of the problems put on the agenda by SIT. That ratio must be reversed. The first step towards cooperative politics would be that the government be formed by all major parties and that - to the extent possible - they must through honest negotiations - reach an agreement; if they fail, they can and often do resign, or resort to their sometimes awkward but democratic referendum. In Switzerland, it has worked for seven centuries. To be honest, the actual negotiations must be separated from the establishment of facts and require that these be as objective as possible (see **Selection and validation**).

WHO IS GOING TO ENSURE SELECTION, VALIDATION AND INTEGRATION?

Whatever the merits may be of the above and other recommendations made by SIT contributors - for instance by Hans Radder -, they share one property: they deal mainly with the internal problems facing the universities, with the production process of science. The interests of the **users** of science (which includes scientists having to use as axioms findings from other disciplines) come a poor second. Compartmentalization is the main or major cause of the poor performance of social science and of the distrust of science mentioned above; yet I saw no practical proposals for breaking down the walls.

As with so many social ventures, we cannot rely on self-policing of individual scientific faculties (see Max Weber). The two Dutch organisations of science, NOW (financing scientific research of universities) and KNWA (an association of prominent scientists advising the government on the practice of science and responsible for 17 scientific institutions) deal with relationships between scientific organisations themselves, mainly universities, and between them and the government.

They do not settle disputes amongst scientists about the relevance and reliability of their faculties and their products. They mainly deal with their **academic status** which also considers style, scholarship, how well it fits in current research programs etc.; the last furthers the “not invented here” mindset responsible for the excessive delays in the acceptance of a fruitful new scientific contribution, for example 5 years (chaos theory), 20 (fractals) and in philosophy 25 (Frege), plus a plethora of others; and we will never know how many never made it.

As explained in “The purpose of science”, settling the scientific status cannot be done on an ad-hoc basis; some kind of institution should be available the moment a problem arises. It must be independent from the interests engaged in the controversy, another condition that can only be met if the institution exists before the controversy arises. To prevent the group from becoming entangled in its own interests, its members should not depend on this work for their income or status. It should be a loose association of scientists willing to sacrifice some time and effort at the service of good science, and thus for a working democracy. It must be staffed on the basis of co-optation and rely for its authority on its reputation of competence, integrity and objectivity, a reputation that it has to earn by the quality of its ‘verdicts’.

Can the job be done? Yes, given the will to do so, and if we limit our ambition to settling what **can** be settled. Often all it takes is axiomatisation, a simple analysis of axioms, definitions, deductions and the experimental setup. Dealing with other types of errors may be difficult or even impossible. But each success increases the stock of certified axioms available to settle the next bone of contention and increases the value of the products of science to its **users** (which includes scientists not working in institutionalized programs). While this can sometimes be done by a single person, the verdict will be effective only if backed by a generally acknowledged higher authority, namely the above group. Appeal to that institution should be available for all scientists, whatever their affiliation or title, and regardless of their discipline.

Selling the verdict requires connections and ‘political’ sense. The ‘truth’ group then will need support from SIT for getting it under way. Creating and supporting this ‘truth’ group would not impinge on the SIT Agenda. On the contrary, it will come in handy, for the SIT agenda will generate clashes between different interests and views, especially if these disagreements are about theories and facts. For political subjects in a democracy, my book provides a basis for a hopefully fruitful start.

Addendum: EXAMPLES

Free market fundamentalism and a **purely procedural democracy** do not work. Freedom is precious, but absolute freedom is chaos. Procedures are tools for democracy, but only if derived from, or be compatible with, a generally accepted and ‘operational’ definition of democracy. Adam Smith himself noted that his invisible hand can function only if embedded in a common context, in some kind of morals/laws that ensure the integration of individual actions and thus the cooperation that lies at the root of a viable and preferably prosperous society. That should be the job of political science and of philosophy-as-a-meta-science, but they have failed. It left our western democracies defenceless against fundamentalists, today the reign of a mythical and unfettered of a capitalistic free market economy based on - and nourished by - a rampant individualism (see for instance t’Heertje). It ignores the needs that do not allow allocation by a

price, and it spawns financial and other tools that prevent us from giving the long-range the consideration it deserves.

By and large, our politics suffer from the same ills: it promotes the competition that comes naturally to the descendants of chimpanzees, but at the cost of the main source of human power and well being: a unique and practically unlimited range of cooperation. **Precedence of competition over cooperation** is the cause of most of the problems of our democracy or/and put on the agenda by SIT. And it led us to horrible misadventures because a real democracy is not an export article; it must grow from within. As amply proved by its results, democratic procedures alone are only window dressing.

Rawls' contract theory of justice. He wants "to generalize and carry to a higher level of abstraction the traditional theory of the social contract as represented by Locke, Rousseau and Kant." He certainly did, but by his own admission he could not solve the vital problem of compliance. If he had looked at real contracts instead of building on Locke, he would have noted that all contracts start by defining its objective and serves as a litmus test for all its decisions. Justice then becomes a means to achieve this objective. The first part of the objective is shared by to all societies: the need to ensure the coexistence and cooperation required for a viable (and hopefully prosperous) society, usually by some for some form of justice and government. To deduce from this objective concrete and generally valid rules of conduct, we must also specify the kind of society: theocracy, autocracy etc., and democracy. To prevent becoming entangled in inconsistencies, we must limit ourselves to just one additional principle (a consideration that led Rousseau to define one common will of the people: a sovereign and the requirement of total commitment). Such a principle must have priority over all other considerations, and it also will provide the basic principle of justice. In democracy that principle is the subjective equality of all citizens (Glastra van Loon). Coexistence, cooperation and respect of subjective equality then provide the criteria for evaluating any law or decision of the government in a democracy. I have shown that these principles are sufficient to allow us to take all decisions that we need to take in a democracy, and identify those that do not. The democratic principle is the only one that can justify itself, for anyone who rejects it ipso facto foregoes the protection it could have provided again decisions not to his liking. The present system of majority rule is neither just nor effective. We can start, as in Switzerland, by forming a government that includes all major parties and aims at consensus through honest negotiations, honest implying the 'truth' of all facts involved. They began with a one-page contract in 1291 stating their objective, which evolved by trial and (a few nearly lethal) errors to become the oldest working democracy.

Rorty's postmodernism. Rorty fills two books with arguments for the thesis that totally objective decisions or statements about facts are impossible. That thesis is correct and follows from an (as yet not generally acknowledged) adequate and 'operational' definition of information as a process; it does not need his immensely long and sometimes dubious list of supporters. Right at the start of his first book, he deduced from it that therefore striving for objectivity makes little sense. That is a blatant (and apparently unnoticed) sin against a basic rule of logic: that from the falsity of a statement no other statement can be deduced (*ex falsibus omnia*). The impossibility of total objectivity in decision-making should not deter us from to striving for whatever degree of objectivity is possible when establishing the facts in democratic (honest) decision-making.

Brain research. Two articles in the NRC by brain researchers Lamme and Swaab triggered a heated discussion about the role of consciousness and reason in our decision-making. They deduced from their research this role is minimal, that the configuration of our brain and our unconscious information process dictated most of our actions and that the notion of a free will was a chimera. Lamme is the most extreme. Other disciplines engaged in decision-making send in five replies, some furious, complaining that the contribution of their objects of investigation, for instance the social context, were just as **important**. None of them - and to my knowledge nobody else - checked whether Lammen's findings warranted his conclusion, which they do not. The cause: He and others did not take into account the main function of consciousness and reason, which is not to generate decisions but to **control** and, **where necessary**, to **correct** our always active unconscious decision-making process, especially its assumptions about the relevant facts. None of their experiments took account of that function; therefore they do not allow any conclusion about consciousness and reason. See my website, Netherlands, "Hersenonderzoek en mensbeeld", that also deals with other misguided publications on that subject.