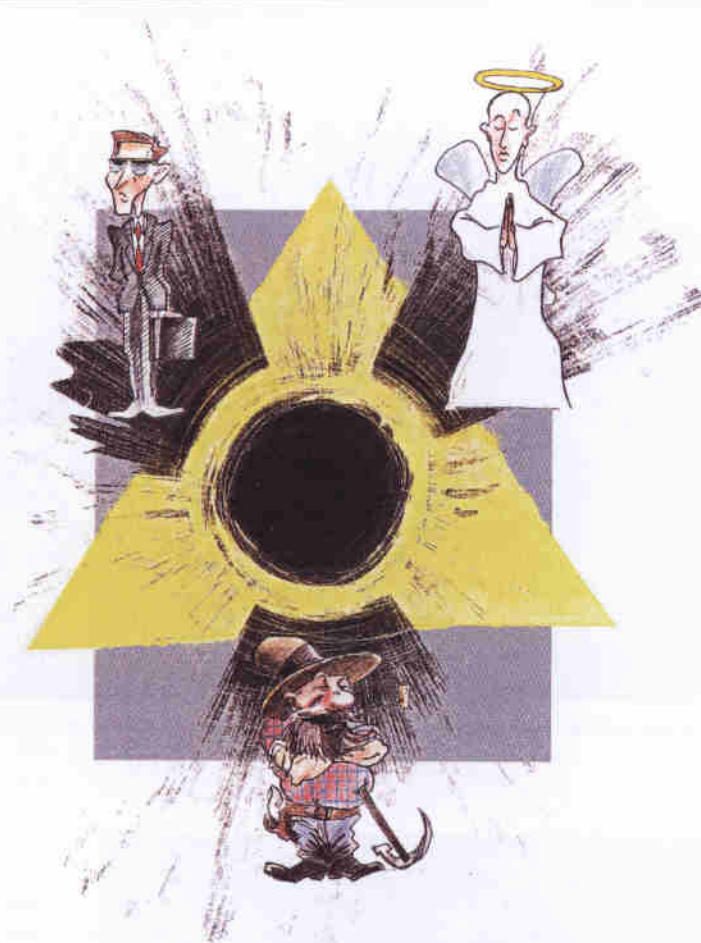


THE ATOM, SYMBOLS AND SOCIETY

CONTAGION OF THE MIND OR
AN EYE FOR DANGER?

SERGE PRÊTRE



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This illustrated pamphlet was first published in 1991, in the French language. ("Nucléaire, Symbolisme et Société. – Contagion mentale ou conscience des risques?" – Société Française d'Energie Nucléaire SFEN.)

Due to the success it experienced, it was decided to translate the pamphlet into the German language and, on this occasion, to expand and make the text more precise. The German title is "Atom, Symbolik und Gesellschaft – Geistige Ansteckung oder Risikobewusstsein?" – Forum Medizin und Energie FME, ISBN-Nr. 3-9529289-2-4. (1992).

The popularity of the pamphlets continued and, due to further encouragement from many sides, it was decided to produce a version in English.

The themes addressed in this pamphlet remain at the focus of those interested by the recent developments in the fields of nuclear energy and radiation protection.

The Author



Radioactive waste has become a symbol of highly toxic materials. It is set in contrast to the sea, symbol of life's origins.

A WORLD OF FACTS – A WORLD OF SYMBOLS

Man is an amphibious animal, living in two worlds at once: the world of facts and a world of symbols [1]. For example, scientists and engineers stand close to the dry world of facts, whereas the majority of the human race move predominantly in a sea of symbols. In reality though, we all make use of a wide diversity of symbols. One could even say that with no symbols there would be no civilisations. We cannot do without symbols. History has taught us, however, that they can also have undesirable consequences.

In science, where one endeavours to describe facts, the illustrative symbols

have been carefully chosen, thoroughly scrutinised and progressively adapted to requirements. When experience yields new facts which invalidate a prevailing model or theory, immediately a new model or a new theory is constructed that takes into account all the facts observed thus far. Hence, in the world of facts, too, symbols have a part to play. But here they are selected with care, and are always subordinated to facts.

The situation is different in the realms of politics and religion, for example. In these areas, symbols handed down from the past can often retain their force although under today's circumstances they may even point in the wrong direction. If these symbols are treated with undue respect, it can happen that in some mysterious way they become 'more real' than the reality to which they refer. Often, the words one uses are not viewed as more or less appropriate means of identifying things and events; on the contrary, the things and events are conceived as representations of the words. In the sea of symbols, therefore, facts are subordinated to symbols.

In the world of facts, judgements are based on an intricate, subtle quantitative analysis. In the world of symbols, judgements are arrived at by making (more or less consciously) a comparison between the situation under appraisal and already established symbols.



Man is an amphibious animal living in two worlds at once: the dry world of facts and a sea of symbols. Facts should properly have priority over symbols, but often the opposite is found.

SYMBOLS LINKED WITH NUCLEAR ENERGY

What many people have in their heads on the subject of nuclear energy is not so much the facts as powerful symbols associated with these facts. Nuclear energy has rekindled in mankind old, familiar symbols from the world of religion, magic, superstition, fear and mythology. For hundreds, indeed thousands of years, people were frightened or fascinated by these symbols. In the past, however, they were based solely on imagination. One could take the liberty of doubting them or laughing at them. Now, after Hiroshima in 1945 and Chernobyl in 1986, something has changed. The old, almost forgotten symbols have been given new life, and for many have even become more powerful. Fear has taken on a new dimension [24].

Among these ancient symbols are [2]:

- the gigantic power concentrated in a very small quantity of matter (the genie in the bottle)
- the monstrous destructive force of the atom bomb (the apocalypse)
- the transformation of matter (the alchemist's quest)
- the questionable mastery of large-scale nuclear technology (the myth of the sorcerer's apprentice)

- the questionable appropriation of a new energy source (the myth of Prometheus and divine retribution)
- the creation of highly toxic waste (the besmirching of Nature by the stuff of the devil - plutonium)
- the insidious nature of radiation that causes genetic damage (vitiated seed).



Horror scenario of the epoch after the apocalypse: vitiated seed produces destitute, innocent mutants.



The myth of the sorcerer's apprentice, who lost control over his own creations.

Along with these, nuclear energy is increasingly finding itself draped with another symbol like a soiled garment, namely that of a scapegoat responsible for all the ills of modern civilisation. There are still people who start rumours [21] or go so far as to construct theories blaming nuclear energy for ailing forests, changes in the climate, deformed bugs and, more recently, even AIDS. Although these rumours have been scientifically disproved, they stubbornly refuse to go away. They conform to certain symbol-laden ideas believed in by many people.

The two halves of the brain function in very different ways. The left part analyses, organises, categorises and calculates. That on the right perceives structures in broad terms and calls on symbols as a means of comparison.

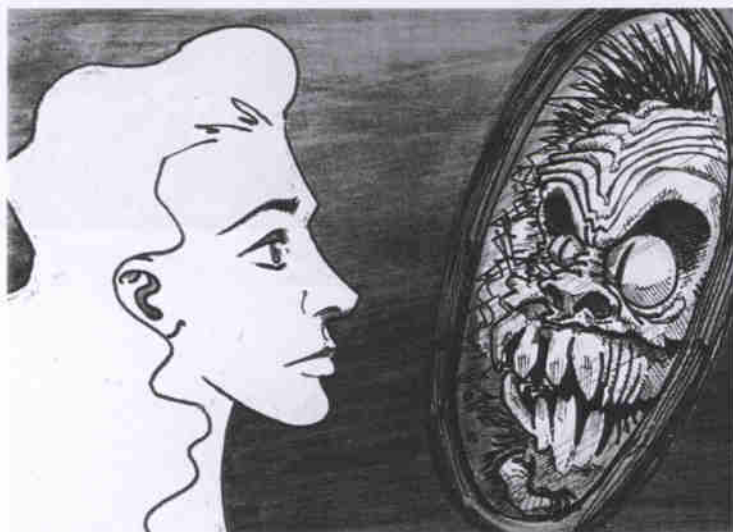


THE LEFT AND RIGHT HALVES OF THE BRAIN

Research has shown [12] that the two halves of the brain perform different functions. The left side is concerned with analysing, organising, categorising and calculating. Its manner of working is rational, logical and selective. The world of scientific fact is thus perceived mainly by the brain's left half. Con-

We do not wish to suggest that one half of the brain is superior to the other. What is important to know is that all persons have at their disposal two equally valuable brain halves and good connections between the two. Evidence of this is the fact that, up to a certain extent, the one part is seemingly able to make up for malfunctions in the other. Nonetheless, for their conscious activities many people make almost exclusive use of only one half of their brain.

In the case that concerns us here, the problem lies in certain brain activities that are not under conscious control. According to Jung [5] these are subconscious notions which, spurred on by a particular event, intrude into consciousness, indeed may even overwhelm it and so induce irrational behaviour. It is no rarity to read in the crime columns the tale of the fireman who turns to arson, or that a celebrated moral paragon has been caught with his standards lowered.



However much one wishes to be a rational angel, occasionally the devil will raise his head. Man's irrational side cannot be suppressed for ever. It wreaks revenge at the first opportunity.

The turn of events surrounding the Chernobyl nuclear accident triggered a phenomenon of this kind. The minds of many ostensibly logical and rational people were inundated by subconscious, symbolic preconceptions from the right half of their brains, releasing a wave of panic.

versely, the right half of the brain thinks in pictures. It interprets structures as a whole, albeit in a rather diffuse way. This, it would seem, is the site of intuition, imagination and emotion. Hence the right half of the brain tends to process the world of symbols.

THE PRECONCEPTIONS

Based on the symbols referred to above, people built up a picture of how things would be if a nuclear disaster actually did occur. Such ideas had been going around in their heads for the past 40 years, taking root particularly in the brain's right half. They were reinforced by science fiction novels and films such as "On the Beach," "Planet of the Apes" and "The China Syndrome," together with press articles and television programmes on the subject. After forty years of this "constructivism" [3], such preconceptions had given rise to a kind of pseudo-reality among many people who didn't bother to try and see these imagined worlds with objectivity.

As it happened, the facts of the Chernobyl accident were, in many respects, not what people had expected. If one finds oneself faced with a reality which does not conform to one's preconception of reality, the result is a psychological dilemma. Subconsciously one attempts to bring reality into line with the preconception. As far as the health implications of Chernobyl are concerned, the full scientific facts are not available even to this day; the epidemiological investigations were not initiated with the proper care, and the data from Moscow, Kiev and Minsk were, and still are, often contradictory. For



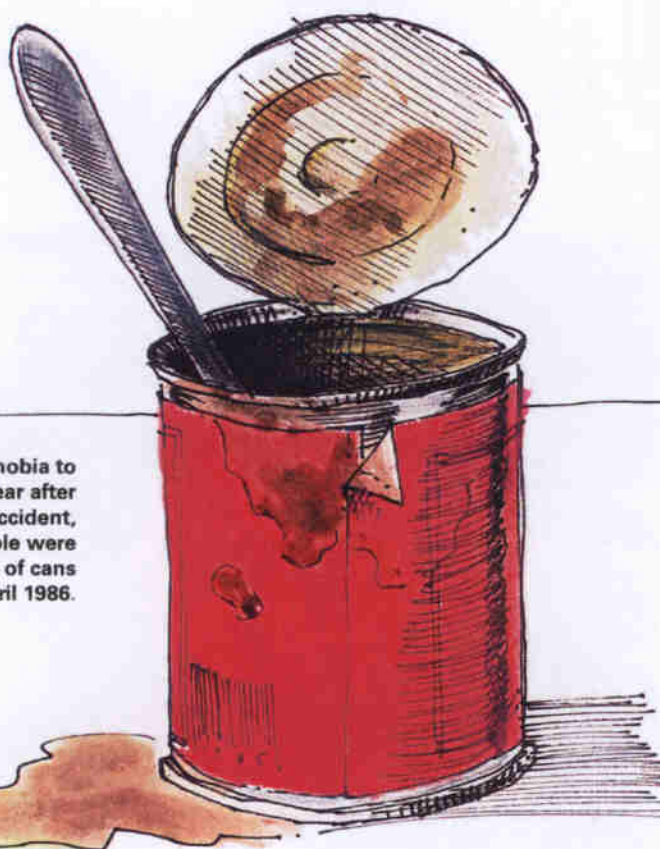
Can we distinguish between our idea of reality and reality itself? What do we do when we find that reality does not match up with our ideas?

many people, this extraordinary blurring of the facts is most convenient, enabling them to stay with their preconceived ideas.

One might have hoped that the certainly serious, but still regionally limited consequences of the Chernobyl disaster would bring people down to earth, and that the facts would once and for all correct any wrong, symbol-laden preconceptions. But this was not to be. All these years after the accident, the effects on the health of the population and the workers involved are still uncertain. The minority of coldly logical thinkers (Cartesians who rely too much on the left half of their brains) maintain

that Chernobyl claimed only 31 victims, while the majority picture to themselves several thousand dead, and hundreds of thousands, if not millions, of people who will die from the consequences of Chernobyl. The two groups are poles apart, incapable of compromising their one-sided view of things.

From radiation phobia to faulty nutrition. A year after the Chernobyl accident, many worried people were still eating only out of cans filled before 26 April 1986.



FROM MENTAL CONTAGION TO EPIDEMIC

When the radioactive cloud from Chernobyl reached Switzerland, Austria, Germany and Italy, a mood of catastrophe spread like an epidemic. Panic swept through those people in whose imaginations a nuclear disaster was tantamount to a world-engulfing apocalypse. And this fear was infectious. As early as 1895, Gustave Le Bon [4] in his book "Psychologie des foules" wrote about mental contagion and absurd behaviour. C.G. Jung introduced

the term "psychic or mental epidemic" [5]. Underlying a psychic epidemic is an idealism, a collective preconception or a collective psychological instability. Also contained under this heading are religious wars, the Inquisition, racism, national socialism [22, 23] and all other forms of nationalistic mania. Even Pasteur's discovery of microbes led to a kind of psychic epidemic among otherwise sensible people concerned with their health.

In the Ukraine and Belarus, this psychic epidemic became known as radiation phobia. In Germany, a year after the accident, a number of doctors reported cases of serious malnutrition among worried people who were still eating nothing but food out of cans dated earlier than 26 April 1986 [6]. It is possible that in western Europe at the time, fear of radiation did more harm than the radiation itself.

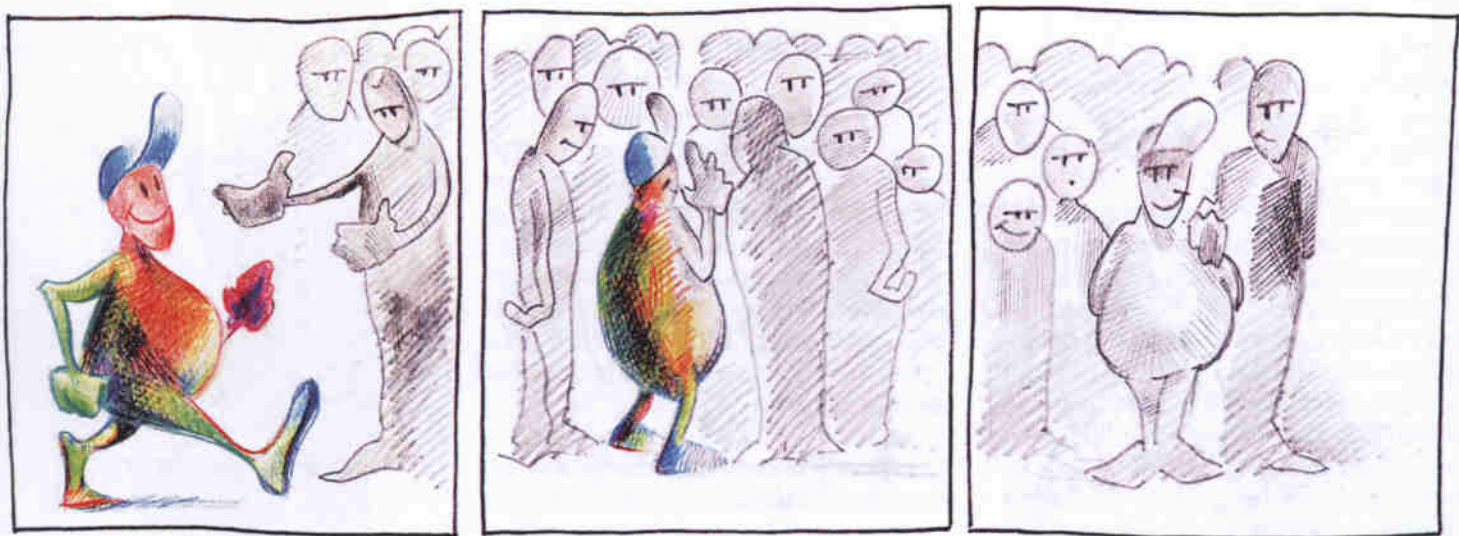
Mental contagion is not a pathological state, but a normal phenomenon that can affect anyone. Humans have a subconscious urge to imitate, and so are influenced by the people around them. When in daily contact with colleagues and friends behaving according to a certain set of values, one is inclined to adopt the same code of values. For example, a person takes on the hue of the political party favoured by the circles he moves in. As Tolstoi put it: "I don't know if there is such a thing as sin, but if there is, it consists in moving in a closed circle of people who all think the same way." By his reckoning, humans are conditioned beings who think they are free, most of the time not realising that they are conditioned. Berkeley, a somewhat cynical Irish philosopher, stated: "There are very few people who really think, but everyone definitely has an opinion."

THE THREE SOCIETIES OF MARY DOUGLAS

For a psychic epidemic to spread, there has to be a "favourable" societal environment. Sociologist Mary Douglas studied this environment [7, 8] and identified three large categories of people. The three groups differ according to the value systems prevailing in them: running through the first is the concept of freedom, through the second the concept of order, and through the third the concept of purity. However much this may appear to be a manufactured distinction, these categories do exist in real life and indeed have been studied in detail by anthropologists among primitive peoples. Behaviour patterns of this kind are observed more easily in

primitive than in modern societies, where social conduct is more intricate and the three main behavioural classifications can be found mingled in one and the same person.

The three categories exist in any society, together with countless hybrid forms in every permutation. The more evenly the three groups are distributed, and the less the prevalence of extreme viewpoints, the more moderately will a society react to risks and dangers. In the following these three groups are considered specifically with regard to their attitude towards risk.



From mental contagion to psychic epidemic: by imitation people take on the "colour" of their social environment.

THE PIONEER SOCIETY

Sociologists also call it the "hero" society, but we prefer the term "pioneer society". The individuals making up this group are of a dynamic, optimistic and pragmatic disposition. Freedom is for them the most precious possession. Furthermore, they are individualists who in the extreme case tend to seek power. They pay little heed to risks, and find dangerous situations exciting rather than anything to worry about. Instead, such risks and situations are a true challenge that has to be faced up to. Ecological issues are of little concern to people of the pioneer society.



The pioneer society. They are optimistic, pragmatic and individualistic. Their prize possession is freedom. They care little about risks and ecological matters.

THE ORDERLY SOCIETY

Sociologists also call this the "bureaucratic society". Its members' preferences can be summarised as "method", "structure", "rules" and "laws". Orderliness is the most precious thing for these people. Wherever possible, they try to establish hierarchies and classifications. In extreme cases this society is inclined to become a caste system.

The orderly society uses dangers as an opportunity to tighten up the rules and regulations. They attach great importance to safety standards in general. If possible, these standards must also be quantified so that order is even more perfect. Here, picking a particular number is less important than the fact that a numerical value is set down in black and white. At the same time, the choice must be made according to the pertinent rules and regulations, since the underlying golden rule is coherency.



The orderly society is typified by method, structure, rules and regulations, hierarchies and pigeonholes. Existing hazards are taken as an opportunity for stricter laws.

THE PREDISPOSITION TO PSYCHIC EPIDEMICS

It seems that psychic epidemics are unable to spread in the pioneer group. These people are too individualistic to let themselves become involved in any collective action, either good or bad. But a society of pioneers is ruthless, not infrequently throwing out its weaker members.

The orderly society offers fertile ground for psychic epidemics of a fascist, racist or nationalistic nature.

The purist society, on the other hand, is a potential hotbed for psychic epidemics associated with defilement and sin. The impact of Chernobyl escalated in this group; here all sense of discernment was lost, leading to a virulent mental contagion.

THE MORALISTS OF PURITY AND HEALTH

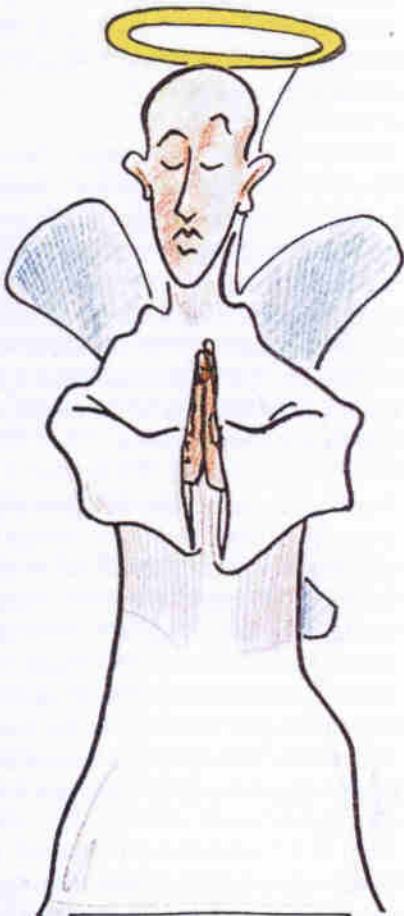
The advocates of purity were very influential already in primitive societies and also in the Middle Ages. They were pushed into the background by the Enlightenment and the dawn of science, but have re-emerged strongly in recent times. The group is gaining ground particularly in wealthy, highly developed regions. These were the people who aroused a growing awareness of environmental issues. They serve as a restraining, indeed welcome, counterbalance to the over-eager pioneers [19]. The extreme elements in this group, however, have built up a positively sectarian fanaticism.

In its modern guise, the purist group practises the doctrine of good health seemingly to allay the fear of death [15]. Everything that in any way might bring death closer incites feelings of gloom and despondency. The most avid adherents of this group have become narrow-minded moralists to whom one would like to say: "Instead of wanting to add years to your life, put more life into your years." The celebrated philosopher and psychoanalyst Erich Fromm described this morbid attitude as follows [17]: "Normal thinking in the face of a potential danger consists in believing (consciously or unconsciously) that the hazard will occur with a given degree of probability. Paranoid thinking is based on the premise that logically it is possible that the danger will happen, and demands absolute safety."

The purists thus endeavour to offset their fear of death by demanding complete safety, which can never be more than a fond hope.

THE "PURIST" SOCIETY

To sociologists it is also the "sect society." Its members' fundamental attitude is summed up by words such as "health", "cleanliness", "protectiveness" and "morality." Their highest aspiration is purity. On the whole they are rather pessimistic people, and their views often have a sectarian flavour. Under extreme circumstances this group has a propensity for self-destruction. The "pure" society makes use of outside dangers to strengthen cohesion within the group it wishes to protect. It thus has a tendency to shut itself off from the rest of the world and cultivate its own ideas.



The "purist" society advocates good health, cleanliness, protectiveness, morality and above all purity. It constitutes a favourable social setting for psychic epidemics associated with defilement and sin.

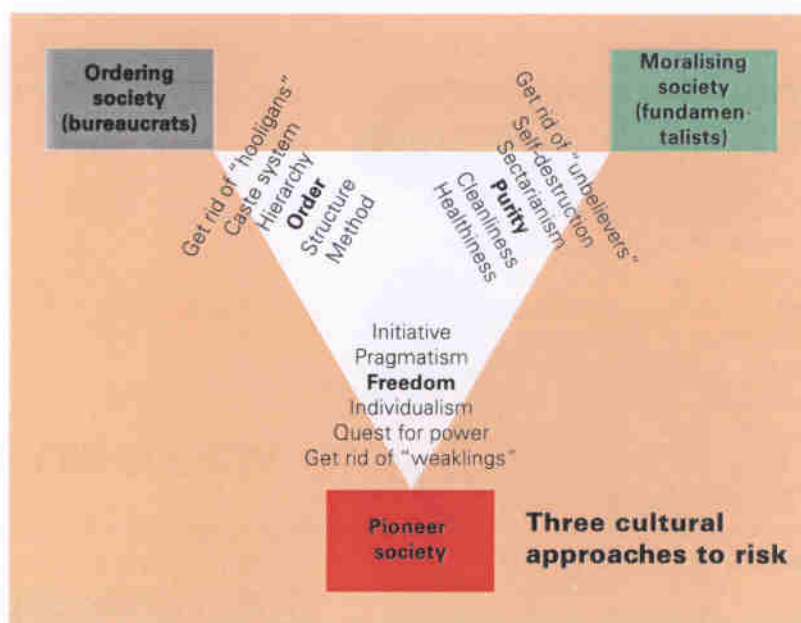


Fig. 1: A modern society can be considered healthy and balanced when its point of equilibrium is roughly in the middle of the triangle.

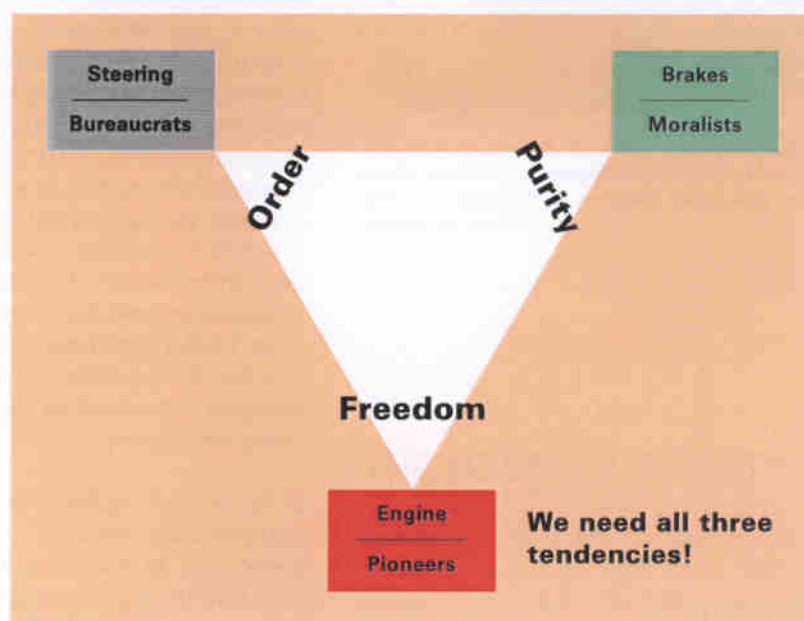


Fig. 2: Just as a vehicle needs an engine, steering wheel and brakes, so society requires good mutual relations between the three tendencies in order to function properly.

A BALANCED, "HEALTHY" SOCIETY

All three social categories we have briefly described serve a useful purpose in a modern society. But if one of the three behaviour patterns begins to gain the upper hand, the society in question tends towards extremism, and this can prove to be very harmful.

The diagram in Fig. 1 illustrates the situation [9]. In a triangle formed by the "pioneer society", the "orderly society" and the "purist society" there is a point as near the middle as possible where society as a whole attains perfect equilibrium. This means that the

three basic tendencies are just about equally strong, and extremes in one direction or the other do not arise. An ideally balanced condition would be attained if everybody combined within themselves each of the three basic attitudes: initiative and pragmatism + method and structured thought + preservation of health and cleanliness. The characteristics of each group are shown to be more positive towards the centre of the triangle. The negative features appear only if there is a strong shift to the triangle's corners. The functions of the three fundamental tendencies can be illustrated by comparing society with a car. For a vehicle to operate correctly, it must have three essential components: an engine, steering wheel and brakes. Fig. 2 shows how these components can be equated with the three kinds of society.

If we look at the way Europe has developed over the past forty years, we can detect a clear trend. At first, society was borne along by a very firm belief in the blessings of technology. People displayed mainly the characteristics of a pioneer society. The vision of freedom was a powerful incentive. Over the course of the last forty years there then followed a gradual shift towards the society of order and more recently to a moralising society.

Ten or twenty years ago, the "pioneers" and "bureaucrats" together held a comfortable majority. The purists' warnings were given scant attention. But the "coalition" at the time failed to recognise the ecological constraints on material growth and to take appropriate measures. The result has been a gross waste of resources and serious damage to the environment.

The purists have today become a large, group with clout. Some countries have witnessed spectacular shifts of power towards a new majority coalition formed by the "regulators" and the "moralisers". A majority made up of these groups is capable of rendering the "pioneers" ineffective, so destroying society's "engine". This could be the beginning of the downfall of our society (Fig. 3).

There is no alarmist intention behind these simplified reflections. The aim is more to demonstrate that a balanced blend of these three underlying attitudes will continue to be essential for our future.

At one extreme is the
 irreproachable, rock-
 solid authority of the
 professor, at the other
 the constant arrogant
 questioning of the
 trendy.



THE WORLD OF FACTS PUT IN DOUBT

The interacting forces described here are aggravated by another characteristic of our modern world.

At a time when the sciences still bowed to Newton, the idea of querying the findings of these so-called "exact" sciences was inconceivable. In those days, not all that long ago, one was expected to show discipline, rigour and respect towards the leading pundits and their teachings. To have questioned the pronouncement of a professor would have required unusual temerity.

Much has changed since then. Perhaps Heisenberg's uncertainty or Einstein's relativity have something to do with it. The fact is, we have gone to the other extreme. More and more people feel that anything and everything can, and must, be questioned.

Admittedly, the world of science and scientific facts is no longer a monolithic, unassailable bastion. Many facts taken as proven have had to be replaced by statements about their probability. Science is becoming ever more complex and intricate [13]. This is far from meaning that everything can be questioned. Science continues to provide dependable benchmarks in mapping out the world of facts. But today these benchmarks are less obvious and more subtle.

For example, no self-respecting scientist can any longer assert that such and

such a system is safe, or a product harmless. He must call on qualifying phrases (stating probabilities, perhaps) when speaking of terms like safety or toxicity. Sadly, his very scientific rigour is often interpreted as a lack of confidence or as conceding that there are negative aspects.

The element of uncertainty, unavoidable in modern science (and manifest in terms such as "probability" and "confidence level"), is unfortunately a godsend for all those who stand to gain from concealing their paucity of special-

ist knowledge. The general public, the media and book publishers have difficulty distinguishing a scientist from a charlatan. The outcome is an inextricable jumble of competent reporting together with widespread, inaccurate and erroneous information. And information is itself always a complex mixture of facts and symbols.

As a result, the reputation the world of facts used to enjoy in the eyes of the public has become tainted, indirectly adding yet further to the importance of the world of symbols.

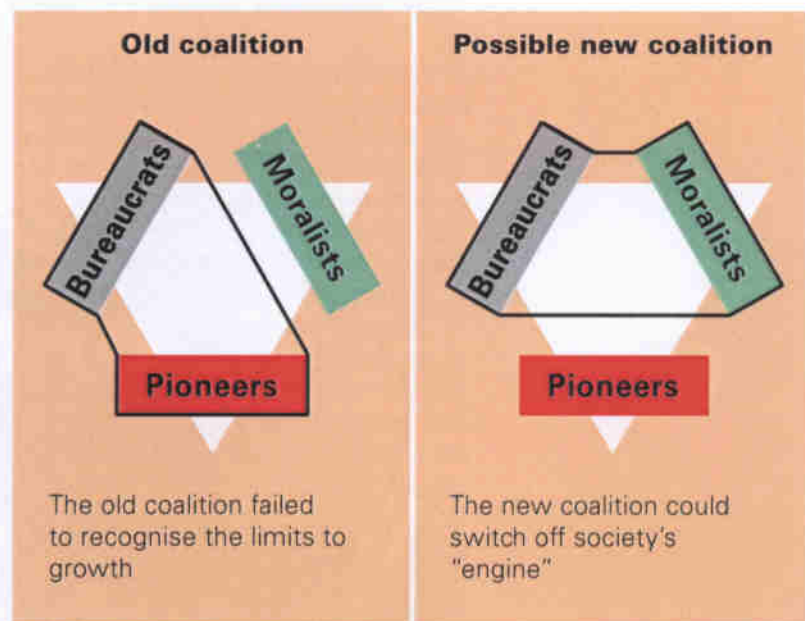
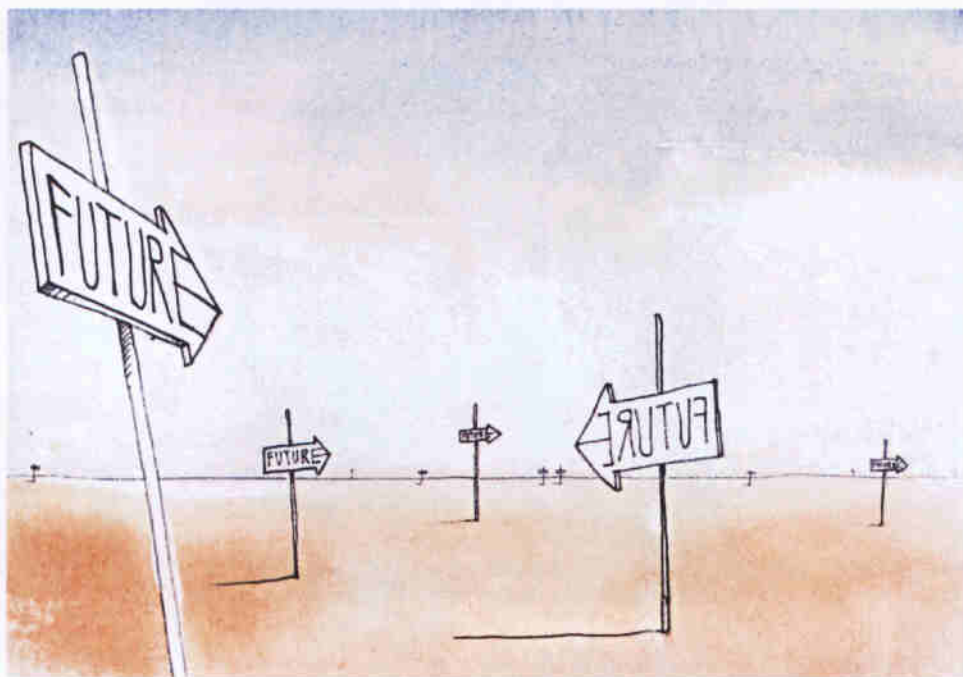


Fig. 3: From a forward-driving coalition to a coalition that puts the brakes on. In some countries, the new majority may stall the "engine" of our society, heralding a period of decadence.



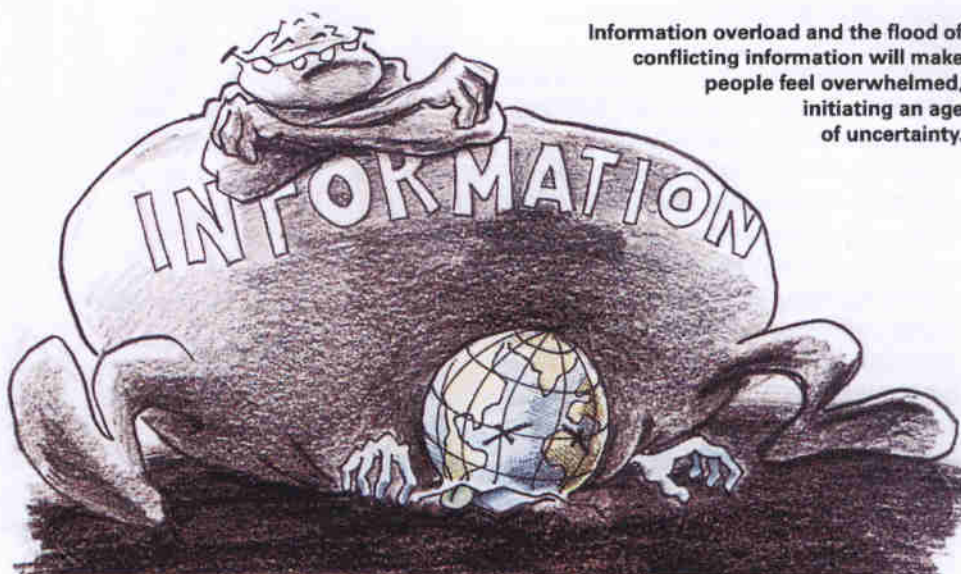
Certainly many things can be questioned, but not all. When the dust of controversy has settled, there remain a number of pointers showing the way to the future.

FACING AN AGE OF UNCERTAINTY

The coming together of all the factors described strongly suggests that we are entering an age of uncertainty marked by a veritable avalanche of contradictory or misinterpreted information. People no longer know who or what to believe. Chernobyl is perhaps the first striking example of this new state of affairs, which calls for new levels of adaptability on everyone's part.

The difficulty is partly that we need feelings of assurance [10], and partly that our ability to make our own judgments has deteriorated. Man of tomorrow [14] will have to evolve a strong personality and a sound, independent sense of judgement if he is to live without fear in an overinformed and disinformed world offering him countless possibilities. He will have to learn how to reject dogmatic mind-sets, rid himself of doctrines and cast aside convictions that give him a false sense of security. He will have to summon up the strength to live constantly with uncertainties and to accept paradoxes. In other words, he will have to overcome his need for certainties. Having accomplished this immunity to conditioned responses, he will then regain his ability to judge for himself [18].

This will be an advance towards what Jung calls "individuation" [5]. By this he means a state of mental maturity in which individuals use both halves of the brain, are aware that symbols can exert an indiscriminate influence on them, and in which their point of balance is close to the middle of the triangle in Fig. 1. Before this progression takes hold on any scale, in some countries we will probably first have to go through a period of obscurantism; a time during which the purist zealots rule the political roost and, because of the effect some symbols can have on morality and absolute certainty, will witness a further spread of psychic epidemics.



Information overload and the flood of conflicting information will make people feel overwhelmed, initiating an age of uncertainty.

HOW CAN PSYCHIC EPIDEMICS BE CONTAINED?

The psychic epidemic "Chernobyl" was latent well before 1986. But only then did it break out in full force, and it is still spreading. There must be a way to contain it. But how does one put a stop to a belief that has assumed the trappings of solid fact [11]?

Fear is engendered by the unknown in conjunction with frightening symbols [16]. In order to rise above this situation, one must reach a point where radioactivity, ionising radiation and nuclear energy are as much part of everyday life as flying and the pocket calculator. In an atmosphere of trust and transparency it should be possible to publicise impartially a few dependable scientific points of reference, first and foremost to teachers, doctors and journalists [20]. Thirty years ago, nuclear energy was sold to us as a universal remedy ("clean, safe and inexhaustible"). We



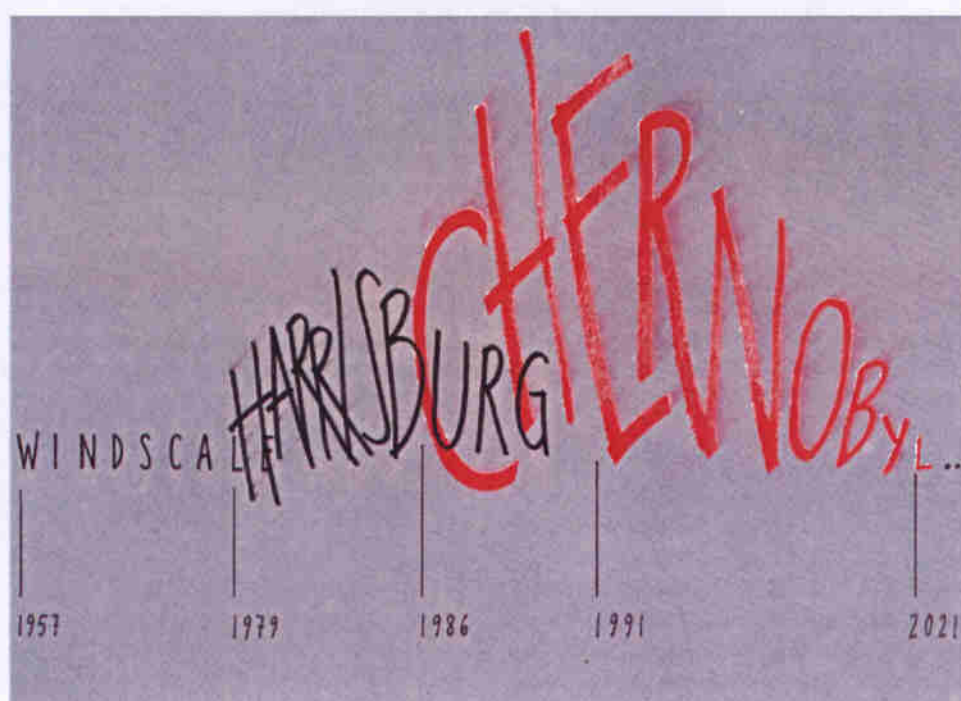
A way must be found out of this "dialogue of the deaf" (between the pioneers hawking "white" symbols and the purists touting "black" symbols). Because facts are not just black or white, but full of nuance and subtle differences.



There are truths that scientists hardly dare to say out loud any more. Where witches stood in the Middle Ages, the nuclear scientist stands today. A new age of obscurantism is in the offing.

have since gone from one extreme to the other, seeing nuclear energy as the work of the devil. We have passed from a "white" symbol to a "black" symbol – and both are wrong. All the more urgent is it, therefore, to get back to the world of facts, a world of fine distinctions.

For this to happen, people will have to discard simplistic views, reject symbols and slogans, and instead think in scientific terms of risk and probability. Then one can draw up a quantitative scale of risks, for instance, and assign the points of reference to their correct place on the scale. In a population cohort of ten million people in Europe, for example, the chances of dying from a bite or an insect sting are scarcely one per year, but from a car accident 1500 per year. And also plotted on this scale must be the risk of living within 10 kilometres of a nuclear power plant or of smoking 20 cigarettes a day or of following a particular diet. One will be astonished to see how much the intuitive perception of risks has been distorted by symbols stored in the right half of the brain.



Memories of Windscale were dimmed by Harrisburg, recollections of Harrisburg swamped by Chernobyl. Now it is time for the wound of Chernobyl to close, without being ripped open again by another disaster.

FINDING AN ANSWER

The following thoughts may help towards finding a solution to this worrying problem. Everyone needs to:

- take the trouble to differentiate between reality and their preconceptions about reality,
- learn how to deal with probabilities, nuances and uncertainties,
- try and distinguish between facts and pseudo-facts,
- realise that people are conditioned by memorised symbols,
- make an effort to balance their underlying attitudes between individualism, order and morality.

If these suggestions look like a counsel of perfection, that is no reason not to make the attempt. Teachers, journalists and doctors could contribute most to this maturing process.

And beyond all this, one thing would help crucially to enhance the reputation of nuclear energy: the absence of any major nuclear accident over the next 50 years. That would be truly persuasive!

THE AUTHOR AND THE ILLUSTRATOR

Serge Prêtre, the author, is a physicist. His career has been dedicated to radiation protection, a field in which he has won international acclaim. One of his jobs at the Swiss Federal Nuclear Safety Inspectorate was to manage the crisis caused by the consequences of Chernobyl. This enabled him to observe the widely diverse reactions and view them in the light of his second-line training in social psychology. He is particularly interested in the phenomena of mental conditioning and "copy-cattling" which in extreme cases can lead to veritable psychic epidemics. In this pamphlet, Serge Prêtre's aim is to show the connection between this socio-psychological phenomenon and the fear of nuclear energy. As his message is related to the symbols present, often subconsciously, within each of us, he deliberately uses the language of symbols to reach his readers.

Christian Brunner, who did the illustrations, is the author's godchild. He was studying architecture and is a great fan of comic strips. He has already drawn several himself, and in them reveals an individual style of sensitivity and humour. In his drawings, Christian Brunner often tries to express himself by means of symbols. He volunteered to collaborate with the graphics for this pamphlet.



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February 1999

HSK, Würenlingen (Switzerland)
Postal address: HSK, CH-5232 Villigen-HSK
Telephone: +41 (0)56 310 39 41
Telefax: +41 (0)56 310 39 95
Internet: <http://www.hsk.psi.ch>