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# Preface

## STRIVING FOR TRUTH

The scathing recognition that the truth is unattainable is one of the formative experiences in a person's life. Ascertainment of the truth is a basic, some will say existential, necessity for an observing, thinking person. The fear that there is no light at the end of the tunnel is one of the sources of the existential crisis that befalls many of us in midlife.

British philosopher Bernard Williams (1929–2003) described the two facets of truth: accuracy and sincerity.<sup>1</sup> Accuracy signifies adherence to beliefs that reflect reality in the closest possible way, and sincerity implies the commitment to expose fully the statements of truth that a person believes in. We tend to be convinced, slowly but consistently, that truth as defined by these two aspects is nothing but an illusion. We sharpen our ability to observe and understand, and at the same time we realize that our knowledge of reality is restricted, and that our beliefs in the pattern of reality are nothing but a reflection of the limits of human intelligence. We deepen our understanding of society, and gradually become aware that social, political and economic structures are based on hypocrisy and sanctimoniousness.

In a complex, competitive and hedonistic world, the value of qualities such as determination and consistency decreases progressively. We are increasingly tempted to surrender to basic inclinations such as the herd instinct – a belief in the accepted norm, and simple laziness – avoidance of effort that does not promise returns. We tend to adopt available and easily accessible statements of truth even if they are not completely accurate. In the context of a social reality where competition ranks above cooperation, sincerity becomes a rare commodity, and tactics of concealment, deception and pretense are considered a necessary evil. Most people agree that sincerity is a vital precondition for building trust between individuals and crucial to the existence of social institutions having a common goal. But in a world where short-term goals prevail, the building up of trust is not a priority.

Nevertheless, there are those who believe that striving for the truth is of paramount importance, even if this is a complex mission, and even if the truth is not within reach. Elucidation of the truth is a necessary, though insufficient, condition for accepting changes in reality. Determination and the ability to change reality is what makes humans unique. The truth does not fall into our hands like ripe fruit. Uncovering the truth requires imagination, reflection, introspection, firm resistance to self-deception and self-fulfilling thought, and especially endless perseverance, steadfastness and consistency.

## THE TRUTH OF THE SPECIALIST

In the past, science, the arts and religion offered different viewpoints to a complete picture of the world. At a certain stage humans took a sharp turn and displaced God's seat from the summit of the universe to a mound of minor details. They strove to create a world of specialization built on reduction and analysis. Dealing with the particulars was assumed to be the key to man's strength in the universe, a means of increasing his powers of prediction and consequently enhancing his control over the ambient reality. The success of this turnabout cannot be ignored, but at the same time we should not turn a blind eye to the price paid for focusing on details while disregarding the context. Specialization and atomization eventually lead to a state where all human activity loses significance.

Every individual living in a modern society finds, at least once a day, that he needs vital information which is unavailable or unattainable. The modern solution for coping with the boundless expansion of knowledge is epistemic division of labor – the specialist solution.<sup>2</sup> Enlisting the assistance of a specialist is based on adopting his truth, on the belief that the specialist holds the key to the correct approach to the segment of reality appropriate to the time and place, and on the trust that the specialist will always transmit everything he knows, hiding nothing. The activities of specialists in society are founded on two basic principles. Firstly, it is assumed that the professional's truth is subject to solid social norms which cannot be changed freely according to the whims of one individual or another. Secondly, the specialist's commitment to the truth is absolute. If the specialist discovers that the axioms according to which he functioned were erroneous, he should

abandon them publicly without taking into account other factors such as prestige, respect or personal loyalty. Such was the attitude of Sir Dominic Corrigan (1802–1880), the Irish physician, who claimed “Whether my observations and opinions be disproved or supported, I shall be equally satisfied. Truth is the prize aimed for; and, in the contest, there is at least this consolation, that all the competitors may share equally the good attained”<sup>3</sup>

In a complex and constantly changing world, many specialists feel that the ground is slipping out from under their feet, and that they are gradually losing their epistemic authority. The truths that established the foundations of their expertise undergo rapid changes. In the best case these truths become irrelevant, and in the less favorable case they become untruths. The ability of a specialist to defend the body of knowledge on which he bases his activities is decreasing progressively. The need to attain deeper insights, to discover the roots of the elusive truth, thus becomes urgent and vital. As difficulties and obstacles multiply, many are motivated to choose alternative paths. Some of these are destructive, like escape into the irrational world of imagination and falsehood. Some are less extreme, like dimming the lights, observing the moves exposed on the surface in an endless wandering through the murky swamp of reality, totally refusing to search for the contexts and contemplate the results.

These processes did not pass by the sensitive reciprocal relationships between physicians and patients. Every day physicians and scientists learn that a drug thought only yesterday to be life-saving is now considered lethal, following the thrust of another scientific study, and vice-versa. Changes in the truth occur openly and the process is revealed to all. The mass media transmit the fresh news to every house in real time. Gone are the days when physicians recommended bloodletting as an important and vital procedure many years after it had been shown to be non-beneficial and sometimes lethal. Both parties, the physician and the patient, are experiencing a profound crisis. And the cure, alongside the striving for truth, calls for a deep awareness of the difficulties and obstacles that delay, or even impede, its ascertainment.

## COMPLEX SYSTEMS

The study of truth-finding in the biomedical field is a fascinating challenge. The systems involved in uncovering the biomedical truth are complex, and

most of the action takes place in subterranean levels totally inaccessible to the external observer. Sometimes the investigator himself has difficulty in identifying the spark that lit the flame. The difficulty increases progressively with the transformation of the original hypothesis, the fruit of imagination and creative thinking, into an established truth that enters the public domain. As we know, history records the achievements of the victors. In science, the victors usually limit themselves to demonstrating an organized doctrine, anchored in rational deliberations, within the narrow and constricting form of the scientific article. Nevertheless, close scrutiny enables the observation of the progress and downfall of ideas and hypotheses. Despite the strict discipline required for publication, arenas of almost desperate conflict and struggle may be found in the scientific literature. These are sometimes revealed in a sentence or two in the introduction or discussion of a scientific article, and sometimes in letters, opinion pieces or editorials written in response to an article.

Many elements are involved in a complex system, each with a different degree of freedom. A change in the function of one element changes the context in which the other elements functioning in it may operate. In describing most of the components of an indistinct system, there are no clear boundaries between the functions and responsibilities of one element and those of another. Hence the results of many of the activities in the system are often unpredictable; all the more so are the mode of action and the outcome of the whole system.

Complex systems, such as scientific medicine, drift along a range between a high degree of certainty to complete uncertainty, and between broad consensus and uncompromising conflict. Drifting between the extremes enables rational decision-making regarding the next stage in a process, but is not sufficient to make self-evident the choice of the subsequent stage.

The most we can achieve is an insight into the general pattern of behavior of the system. Such insight is made possible by cautious and diligent observation, guided by an integrative point of view which allows for the inclusion of elements such as creativity and surprise, so vital to an understanding of scientific medicine. The unifying point of view emphasizes the reciprocal relationships between the parts of a system and is less concerned with description of each part.

The study of complex systems, such as the biomedical system, awakens a conditioned instinct, based on reductive thinking: identification of the

problem and its solution, deconstruction of the ambiguity to solve any possible paradox to attain more certainty and agreement, and transfer of the system to the simple and linear form, where we feel safer, more in control and able to influence. However, a methodical approach to complex systems shows us that there are no radical solutions. The system moves gradually from one state to another, under the influence of small changes occurring simultaneously in different parts of the system. Because of low predictive ability, the individual or the group initiating a change must view it with great caution to ensure that it shifts the system in the required direction.<sup>4</sup>

## THOUGHT PLAY

All types of thought are abstractions restricted to a particular segment of reality. A sequence of directed thoughts may lead to the formulation of a theory, a map of a certain area. Yet theoretical constructs do not cross the boundaries of abstraction, so they can never be completely precise. Mapping out reality by means of a thought play is possible for anyone at any time. In designing a map of reality, the author sketches out the results of his complicated thought play. His map is the starting point for the reader's own thought play.<sup>5</sup>

Thought play is the essence of human creativity. Freedom of action of the human mind is framed within well known ideas and perceptions that the player himself considers self-evident. The play starts off when the player allows himself to call into doubt, to diverge from conventions, to contemplate the pieces of the puzzle, mix them around and arrange them into a partial worldview, a theory, a map. He then looks for new pieces, mixes them around, and tries to form a new picture. Thought play is a continuous dynamic process taking place between the subject and the object. Those who have experienced it will say that thought play can provide much satisfaction, gratification and often even excitement for the player. The intensity of the experience depends on the degree of difficulty and complexity of the mystery, and on the extent of the player's success in overcoming the challenges he has set for himself. The beginner realizes, right from the early stages of the play, that gratification is not immediate and requires no small amount of perseverance and determination.

Some skills are vital to success in thought play. Among them are the power to relinquish firm beliefs and well established ideas, even if this leaves the player in a wilderness of uncertainty; the ability to cross the borders of specialization; and the strength to disregard time limitations.

## THE WORD AND THE TRUTH

Many people maintain that every reader is also an author or a writer. The experience of reading should give rise to new texts based on the imagination and the thoughts of the reader. The reader follows the picture of reality created by the author to deepen his observations, to sharpen his sights and refine his own vision of reality. The author is an individual who wishes to transmit the results of his thought game – by means of language and a meticulous striving for clarity, consistency and cohesion – to reveal a segment of reality to other individuals, and perhaps even change their perception of it. The process of writing therefore comprises three obligations: revelation of the truth, a free thought play devoid of restrictions and inhibitions, and recognition of the power of the word.

A writer who remains faithful to his commitment to truth within the rules of free thought play may find himself on the fringes of society. The activities of writers, aimed at raising self-awareness in society, are in conflict with the aspirations of those who control the money and the power. According to the latter, useful citizens are those with a strong and stable commitment to existing and established institutions, values and purposes. The exposure of reality is in itself an earnest demand not to accept the nature of the society as it exists, and to alter it. This is diametrically opposed to the aspirations of the ruling conservative forces, who try with all their might to preserve the balance which the writer attempts to disturb.

Despite the built-in resistance on the part of the powerful, few things in modern society are of higher value than the written word, on condition that the word is aimed directly at the appropriate targets. In the words of Jean-Paul Sartre: “He knows that words, as Brice Parain says, are ‘loaded pistols.’ If he speaks, he fires. He may be silent, but since he has chosen to fire, he must do it like a man, by aiming at targets, and not like a child, at random, by shutting his eyes and firing merely for the pleasure of hearing the shot go off.”<sup>6</sup>

Vačlav Havel referred to the power of the word in his acceptance speech, entitled “A Word about Words,”\* “In the beginning was the Word; so it states on the first page of one of the most important books known to us. What is meant in that book is that the Word of God is the source of all creation. But surely the same could be said, figuratively speaking, of every human action? And indeed, words can be said to be the very source of our being, and in fact the very substance of the cosmic life form we call man. Spirit, the human soul, our self awareness, our ability to generalize and think in concepts, to perceive the world as the world (and not just as our locality), and lastly, our capacity for knowing that we will die – and living in spite of that knowledge... that words are a mysterious, ambiguous, ambivalent, and perfidious phenomenon. They can be rays of light in a realm of darkness.... They can equally be lethal arrows. Worst of all, at times they can be one or the other. They can even be both at once!”

## ABOUT THE BOOK

The search for truth, as expressed in this book, was conducted on three levels: the historic, examining the points of gravity of the changes in truth along the axis of time; the intellectual, examining competing ideas and interpretations; and the social, assessing the weight of social factors in ever-changing truths.

I proposed six questions for discussion: a) Is there but a single truth? b) Is there only one way to reach the truth? c) Is there a clear boundary between truth and untruth? d) How many facets to the truth? e) Does the truth hang on the fine details? f) Do the general truth and the individual truth converge? These questions express the main subjects that occupy scientists and philosophers of science: paradigms, methods, boundaries, end-points, interpretation and individualism.

Each section includes two to four test cases serving as a platform for a broader theoretical discussion. Some of the test cases deal with the

- ◆ “A Word about Words” (July 25, 1989): In 1989, Havel was awarded the Peace Prize of the German Booksellers Association. It was presented to him, in absentia, at the Frankfurt Book Fair on October 15, 1989. This quote is from his acceptance speech, which was read in Havel’s absence by Maximilian Schell. It was translated by A. G. Brain and reprinted in full in *The New York Review of Books*, January 18, 1990.

hottest controversies encountered in the biomedical world during the past few decades. Among these are: the mechanical approach to coronary heart disease, hormone replacement therapy for menopausal women, mammography for early detection of breast cancer, and asthma mortality rates. Another section deals with the questions that captured public and professional attention some decades ago: smoking and lung cancer, and oral therapy for Diabetes Type II. Other test cases deal with the many important questions that for various reasons did not reach the arena of public debate, such as the evaluation of new therapies for multiple sclerosis, aspirin for toxemia of pregnancy, and anti-arrhythmic drugs.

The main characteristic of all these conflicts is the absence of decisiveness. The time, the place and social priorities modify the levels of doubt and certainty. The sensation of frustration on the one hand and hope on the other arise out of the knowledge that “all is open,” creativity and human thought are left free to shift the balance and alter the picture of reality from one extreme to the other.

## Prologue

It was only towards the end of the 1990s that the professional medical literature began to take an interest in the discovery of the truth. The first signs appeared in 1997. Two Australian surgeons decided to investigate the half-life of dogma relating to “surgical truth.”<sup>1</sup> They picked out at random 260 selected statements representing “surgical truth,” published between 1935 and 1994, in one of the leading surgical journals, the *Journal of Surgery, Gynecology and Obstetrics*. Seven surgeons were asked to review each of the statements and mark them as true or untrue according to current surgical practice of the time. The reviewers found that the decline was linear, with a rate of loss of truth of 0.75% per year, and the estimated half-life of truth for clinical statements in the surgical literature was calculated to be 45 years. For example: about 50 years ago, prefrontal lobotomy was recommended for cancer patients, to release them from fear, anxiety and concern over their impending death. For physicians practicing at the time, this was an absolute dogma, whereas today this recommendation is considered ridiculous.

Five years later a French group published an expanded version of the study of changing truths.<sup>2</sup> They investigated another field of medicine, liver disease (cirrhosis or hepatitis), and broadened the classification of the truths to three categories: valid, obsolete (a new truth was found to be nearer to reality) and false (erroneous). The investigators did not stop at an assessment of truth survival, but tried to discover factors influencing the life-expectancy of the truth. Six hepatologists assessed 474 selected conclusion sentences from articles published in the scientific literature during the years 1945–1999. They found that in the year 2000, 285 (60%) preserved their original status, i.e., were still considered as clinical truths guiding the practice of physicians. Surprisingly, they found in the literature on liver diseases the same half-life of truth (45 years) as that found in the surgical literature. However, unlike the previous study which was considered by many as a whimsical incident, this study revealed an important, even troublesome finding. The reviewers found no difference in the half-life of the truth resulting from studies recognized as

being of high methodologic quality, compared with those conducted by less reliable methods. Nor was there any difference in the survival of the truth when it was later proved to be false, and not merely obsolete.

Some years later, a further level was added to the research on truth.<sup>3</sup> A comparison between survival time of a “hot” truth (published in an article obtaining more than 1,000 citations) and a “cold” truth (cited less frequently) revealed a surprising result. Out of 45 articles included in the “hot” group, where the experimental therapy had been found to be effective, seven (about 15%) were contradicted by subsequent studies published within 10 years, i.e., the therapy was found to be ineffective. Conversely, in the “cold” truth group, there were only about two (4%) for which contradictory results were subsequently published. This finding led to the conclusion that the decline of truth depends only on the number of times someone tries to challenge it by means of renewed investigation of reality (new trial), assuming that a “hot” truth is challenged more frequently than a “cold” truth.

On the one hand: chaos. Truths change relatively rapidly, and the hotter, the more important and significant the truths, the more rapidly they change. Moreover, it is not easy to demonstrate a factor that influences the change; even inalienable assets such as high quality methodology, which is considered more reliable, do not help us in creating a stable truth.

On the other hand: regularity. Since the development of the steam engine at the end of the 18<sup>th</sup> century, economists have noticed that every 50 years a new technological invention, of decisive importance, is born and renders existing truths redundant. The two reviews that studied the rate of survival of truths in medicine concluded that the half-life of scientific truth in medical practice is 45 years. Creative thinking blossoms between chaos and regularity.