Cyril Höschl Lecture, Knighthood of the Truth, Prague 1994

Your Excellencies, Eminences, Spectabiles, Honorabiles, Cives Academici, Ladies and Gentlemen,

Every one of us at times thinks back to the books of his childhood. It is possible that these books create together a certain spiritual, intellectual and emotional affiliation of those who share them. Hidden in them are archetypal elements which act as cultural clasps creating bridges across eras, races, nations and cultures. I can recall one such book which I read when I was about eight years old. It was the Wonderful Journey of Nils Holgersson through Sweden by Selma Lagerlof. Nils, turned into a small sprite by a curse, goes on an unusual pilgrimage beyond the frontiers of the human world, with a flock of wild geese. The journey there and back again transforms him from a pampered child into a young man who understands the breadth of this world. It is still the same theme that concerns us here: the motif of creation and the drama of pestilence and salvation. Theme cum variationibus; a theme which recurs all over the world. It can be heard in the polyphony of Bach, in the titanic character of Beethoven and the suffering of Mahler; it surfaces in the dramas of Shakespeare just as in Tolkien's wonderful trilogy: it is embodied in Michaelangelo's ceiling of the Sistine Chapel, and its echo penetrates into the heart of each and every one of us.

Years went by and philosophy in Prague experienced a boom with the freedom of window-washers, night watchmen, boiler-room stokers and handicapped pensioners. Those of us who were indoctrinated in the natural sciences topped up by positivism corrected this by reading forbidden history and by various attempts at initiation into the "cabala" of spiritual communities which were grouped around transdisciplinary seminars with Prof. Katetov at the Mathematics and Physics Faculty at Charles University, with the Havels on the Rasinovo (then Engels) Embankment and finally at Novotneho Lavka. One such transdisciplinary circle frequently saw Zdenek Neubauer, Ivan M. Havel, Jiri Fiala, Petr Vopenka, Jan and Martin Palous, Kamila Bendova, Zdenek Pinc and a number of others. The dominant theme was the relationship between the mind and the body.

It was there on the Rasinovo Embankment that once, together with a colleague named Jan Libiger, we lectured about interactionism. The main subject of our discussion was a book by the famous epistemologist Sir Karl Popper and the Nobel Prize winning neurophysiologist Sir John Eccles "The Self and Its Brain".

Interactionism is a theory of psycho-physical interaction. Popper opens his argument with a critique of materialism, which he links to an explanation of his conception of three worlds. He recognizes that materialism inspired science and that many great materialists from Democritus and Lucretius up to Herbert Feigl and Anthony Quinton were also humanists, and freedom fighters. Popper divides materialism in science into the theory of continuity (Faraday, Maxwell, Einstein, Schrodinger) which led to field theory, and into atomistic theory (Democritus, Epicurus, quantum mechanics). Both these programs arose from the fact that matter as something that takes up space is primordial, basic; it does not need further explanation and as such is the foundation of all concepts by which anything else is explained. Physics contains a range of explanatory properties of matter, such as the filling of space ("impenetrability"), elasticity, cohesion and state. For Popper, it is physics itself that offers the most important arguments against classic materialism in the way that it transcended itself. So for example the Greek materialists judged that matter fills space and one thing can push into another, which they regarded as the causal interaction throughout the entire world. The world is a clockwork, everything was pushed somewhere somehow, like cogwheels in a system of cogwheels. The first move beyond this view came with Newton's gravitation, which was a pull and not a push, and was the interaction of bodies of matter on one another without mutually touching(!). And so gravitational force, the property of attraction, was declared by Newton's successors to be a basic property of matter which neither can (nor needs) further explanation.

Another event in the history of the self- transcendence of materialism was Thomson's discovery of the electron. What is it? What about the divisibility of matter? Moreover, as soon as it was shown that the repulsivity and thus impenetrability of pieces of matter is given by electronic repulsivity of equally charged particles, the idea of touching, meeting, being put there collapsed as the basic principle. And what is more, even stable particles like electrons can be pairwise annihilated, with the production of photons (light quanta); and they can be created, out of a photon (a gamma ray). But light is not matter, because matter cannot have its speed. Despite this, light can turn a mill in a vacuum. So we can say that light and matter are both forms of energy. We had to give up the law of the conservation of matter. Matter can both be destroyed and created (e.g., annihilation when meeting antimatter in the creation of light). Matter is thus only highly concentrated energy convertible into other forms. It is something like a process interchangeable with other processes, perhaps heat, light, motion. Matter therefore is not a proto- material, substance, essence. As Whitehead said, the universe is not a

museum of things, but a collection of events and processes. The structure of matter is atomic, but the structure of atoms or of their particles cannot be classified in this way. It is almost "material". Physicists moved beyond materialism. They still work with particles, but they no longer say that they are little parts, little pieces of "matter". Man is no longer a mechanical machine, but an electrochemical one. That change is important.

Popper attempts to show that the evolution of materialism is in fact moving towards idealism, but towards an idealism of a new kind. The relationship of ideas to the "materialistic" world still remains to be explained. Thus Popper also devotes himself to the problem of what is real. He explains that first there are real partial things of common size, things that a child can take and put into its mouth. Then the conception widens to larger objects which we cannot seize (mountains) and smaller ones (dust).

How does this expansion occur? It takes place in such a way that entities which we recognize as real must be able to exert influence (causal influence) on "a prima facie" real things (of normal size). We therefore consider changes in the normal world as effects of supposedly real entities. For example, Brownian movement is seen as an effect and therefore as proof of the existence of molecules. We accept things as real if they can causally work or at least interact with the normal material things of our world. Fields and forces are thus real. According to Popper, materialists solve problems by simply calling everything that interacts with their world a form of matter, end of story. What isn't in the form of matter cannot interact with the real world. This statement is very important for understanding Popper's critique of parallelism as well as of materialism.

Psychophysical parallelism is an unusual form of dualism of the modern era. T. Fechner (1801-1887) is considered to be its founder and other representatives include W. Wundt, Th. Ziehen, H. Ebbinghaus, and our own philosopher and psychologist Frantisek Krejci. The well- known Austrian physicist Ernst Mach also identified himself with parallelism. His basic idea can be summarized as follows: mental and physiological functions represent two groups of phenomena - immaterial and physical, material - at once closed into themselves and running in parallel, whose individual temporally corresponding elements mutually correspond to one another. That is to say, firstly that they are unanimously connected to each other so that each phenomenon of the mind has a single "physiological correlation" which pertains only to it, and secondly that they are not connected causally, meaning that they do not evoke one another, they do not act on one another, nor do they influence one another in any way whats oever.

It is this final statement which is in contradiction with the proof of "realness" as Popper puts it (see above), for if the working of the immaterial world did not manifest itself in the real one, we would not be able to consider the immaterial world as real. We must therefore be interactionists in order to be able to account for the influence of ideas. In the case of Popper, Neubauer calls this "tame Platonism". In order, however, to maintain a dualistic idea and not to come into conflict with the law of the conservation of energy, the parallelists denied any real relationship between mental and physiological functions. Through a narrowed understanding of causality, the parallelists came to the paradoxical statement that the mind is not possible without the body, but at the same time is not at all dependent on the body; nonetheless it exists.

Popper, on the other hand, shows that there is an immaterial real world that influences the material world. For this reason he reverts to the development theory that he has to deal with in some way.

Natural selection is usually seen as the result of the interaction between blind chance (mutation) and powers from outside, that a living being cannot influence. The aims and desires of the organism do not usually count. The theories of Lamarck, Butler or Bergson, which count on preferences and aims, contradict darwinism, as it had been put forward until then, since they suggest the possibility of the inheritance of acquired qualities. Baldwin and Morgan corrected this in their theory of organic evolution (Alister Hardy, "The Living Stream"): Every animal, particularly at a higher level, has a different repertoire of behaviour. By adopting a new form of behaviour an animal can change its environment. Through genuine choice (of a new food, for example) it can change the environment and expose itself and its descendants to new pressures of selection. Thus the animal's desires, aims and choices influence the result of natural selection. A typical illustration is the giraffe, whose neck became long due to continuous efforts to reach food that was too high. According to modern darwinists, the preference of the giraffe for such food was original and created a selection pressure that advantaged animals with long necks. It is often difficult to determine whether the primary factor is the anatomical change or the change in behaviour (for instance, change of food and change in the digestion tract) . Unlike Darwin, Popper regards this question as very important. He aims to show how the immaterial (mental) can affect the formation of the material world.

In opposition to the ideas presented so far, Popper (and Eccles and others along with him) offered the concept of three worlds. World 1 is the ordinary material world around us, of buildings, bridges, airplanes, planets, atoms; it is the subject of research in physics and physical laws are valid in it. World 2 is the world of mental experiences and mental states, including consciousness, and the experience of self and of others; of mental disposition (intention) etc. World 3 is a real immaterial world. It includes the content of thought, figments of human thinking, in particular scientific questions, problems, argumentation. This world is real because it affects what we generally regard as reality - that is, the material world 1. It is the product of human thought, and yet, it is independent of our consciousness, but can only be embodied through it. Such encounter, embodiment, occurs in research, in works of art (a sculpture is world 1 but its idea is world 3) etc. As an example Popper states that the problem of the thinning out of the occurrence of prime numbers (immaterial,

pertaining to world 3) is real even without man, just as Mount Everest would be real even if nobody ever saw or climbed it. The solution to a problem (logical reasoning, seeking, counting) pertains to world 2 or world 1 and depends on its originator. Worlds 2 and 3 may come into contact solely through world 1 (physical, chemical, physiological processes), which acts as a kind of computer (brain, machine).

At a lecture at the third faculty of medicine of Charles University last year, Sir John Eccles explained his idea of the encounter of the immaterial mind with biological processes in neurons on the micro level. In his opinion this is a probabilistic process that could be envisaged as a kind of resolution, whether or not a certain amount of a neurotransmitter from the synaptic granula will be released.

When we came out onto the embankment after that seminar at the Havels', we were, as always, quite ignorant as to our own future. Popper, Einstein, Schrodinger, Eccles and Huxley knew and corresponded with one another but for us they did not exist. They belonged to a different world that it was impossible to project on the future of our part of Europe at the end of the 20th century. To us they were as much classics as Madame Curie or Claude Debussy.

Not long after the seminar I came across Popper's intellectual autobiography, typically entitled "Unended quest". The word "quest", however, has another specific meaning in English. It means the quest of Arthur's knights for the Holy Grail, the mystical vessel which held Christ's blood, the quintessence of the Embodied Truth. I opened it and I was cast back into my childhood: the young Popper had also read about the wondrous wanderings of Nils Holgersson through Sweden. He, the renowned figure, the cosmopolitan born in Vienna and knighted by the Queen of England (1965), had been carried into life by the same blue goose, Akka of Kebnekaysa, that always became watchful when it smelt man. I could not stop reading this autobiography. How familiar I found his statement that a man should never be more precise than the particular problem situation requires. He criticised philosophers for their never ending efforts to give exact definitions of terms. It is hypotheses and not terms that matters, he would say. The relation between a term and a hypothesis is similar to that between a letter and a word: if you make a typing error, you still know what it means and one letter is not important. It is always undesirable to try to add to exactness just for exactness' sake, in particular as far as language exactness is concerned, as it leads to a loss of clarity. As an example he cited a pun that Bertrand Russells' grandmother teased him with: "What is mind?" "No matter!" "What is matter?" "Never mind!" It is better to ask "What does mind?" as this can be tested. I apologised mentally for all the teachers that make their little pupils suffer with questions "What is...?" and punish them for answers like "Definition is when...".

I found that Popper too worried, when he was seventeen, about the question of what in fact science is. He tried to find a demarcation line between science and pseudoscience, between dogmatic thinking and critical thinking. He followed Einstein who stated at a lecture in Vienna in May 1919 that it would be necessary to forsake his theory if observation did not find the red shift caused by gravitation. That was Popper's stellar hour: science in fact puts forward hypotheses that it is possible to test. In his terminology, possible to test means possible to falsify, to disprove. If somebody says, for instance, that all swans are white and I bring a black one to show to him, he then has two possibilities: either to correct his original statement, which means that he uses scientific methods, or to state that the black one is not a swan. Popper calls the latter the immunization of a hypothesis. He who immunizes his hypothesis against any kind of falsification is still "right". As an example of genuine scientificness Popper cites Einstein, who opened the way to disprove his hypotheses from the start. In Popper's opinion a scientist is someone who is able to give a definition of circumstances in which his hypothesis becomes invalid. For Popper psychoanalysis, on the contrary, is an example of pseudoscience. He says: If you go to see a psychoanalyst, he treats you and if you feel better afterwards, he says: "You can see now that it works, you are feeling better now." If you feel even worse and you do not want to continue with the treatment, he will say: "Now you find yourself in the expected stage of resistance and this proves that everything works as it should." Marxism also used this way of immunizing itself, remaining unshaken after history disproved its postulates one by one. One little postscript to this: Popper distinguishes between honest and dishonest immunization. Honest immunization defends a theory by expectations that can themselves be falsified. When, for example, Newtonian physicists claimed that there must be another planet beyond Uranus because they could not explain the deviation of the course compared to the calculation in any other way, they immunized their theory of the movement of cosmic matter. This immunization was in fact basically falsifiable. When methods of observation improved, they were found to be right. Their immunization contributed to the search for and eventual discovery of Neptune. Dishonest immunization, on the other hand, makes it impossible to falsify any hypothesis. From the point of view of science, the unscientific is everything that is not falsifiable.

Popper reformulated Hume's problem of induction: according to Popper induction does not exist. General theories cannot be derived from individual events but they can be refuted by individual events because they can be contradicted by the description of facts. The idea always comes before the fact: the fact either disproves the idea or not. It never happens the other way round. Science always uses deduction.

Popper draws attention enchantingly to the fruitful dialectic of dogmatic and critical thinking. As if the former could not develop without the latter. This happens as in ontogenesis, as a child goes through his physiological period of dogmatic and obsessive thinking only to change later on to strict adolescent criticism, just as in history. Popper had a charming if not perhaps quite true hypothesis about the origins of old European music: "The church brought people into the churches, the people were made to sing Gregorian chants in unison during the mass and they found themselves in a situation when not everybody was able to sing in unison with all the others. Thus from time to time he had to move his voice down to the

nearest alternative consonant and a note appeared against a note, point counter point, and thus counterpoint." Popper sees in this the nucleus of Bach's polyphony and finally also of romantic music. It is an illustration of how I imagine that free creation bound only by form breaks through to heights, and paradoxically it is only this bonding by form that produces the impulse to great works. That is why Bach's music could not have come into existence in Africa, in Latin America, in Australia. Applying this, church dogma has cultivated European music into the likenesses of Bachs, Beethovens and Mendelssohns. So there is something that apparently steps forwards against creativity, but this duel is a projection of oversimplification. In reality it is a harmony. Without form there is no valuable content, something has to happen, some obstruction has to come, we have to assume a handicap to be able to create any great work. The history of art is not thronged with those who had an easy life. Antagonism which is put on us provokes creative efforts to break a path.

In a supplement to The Economist from February 16, 1991 an editorial states: "Generally speaking, scientists treat philosophers as they would mosquitoes: as irritating parasites. They complain about the straitjacket into which Sir Karl Popper has put them. Every time they write a proposal for a grant they have to put it in Popperian terms, setting out clearly a hypothesis and how they will test it. For most of them, the whole point of a grant proposal is to get money to find something out, not to test an existing hypothesis. They are explorers, not patent clerks." Here we reach the core. A scholar who is a follower of popperism must be aware that he does not live according his principles and ideals. Here Popper stands against T.S. Kuhn, who explicitly rejects the concept of the "truth"; according to him, the only aim of cognition is to force its path and to survive at any price. At first sight, Kuhn's concept comes closer to the actual state of things. In all eras M. Bonacieux and Sancho Panza were right "in concreto", but history has always honored Don Quixotes, Cyrano de Bergeracs and d'Artagnans. Science too is obliged for its existence, sense and prestige not to its prosaic everydayness, but to its fully illusory and unfeasible ideal: the knightly order of truth. A scholar may not spend all the days falsifying hypotheses, as he would do according to Popper. He is different however from, say, a politician or a priest: he is ready, at least theoretically, to change his opinion if facts change. He revels in his ignorance, because it is his raw material. Karl Popper has put his finger brilliantly on this ideal in the manner of the troubadours of old and become its prophet. His intellectual autobiography is proof of that. Who actually is its author?

Sir Karl Raimund Popper, C.H., K.T., M.A., Ph.D., D.LITT, F.R.S., F.B.A. is the most eminent living philosopher of science (epistemologist). He was born on July 28, 1902 in Vienna, son of Dr. Simon Siegmund Carl Popper and Jenny Popper, nee Schiff. Karl Popper worked briefly as a manual labourer and tried woodcarving for a while, but this work ran aground on his rich internal intellectual life, which dispersed his attention. He married Josephine Anna Henninger in 1930. He studied mathematics, physics and psychology at the University of Vienna and then worked first as a teacher in secondary schools, and later as a senior lecturer in the department of philosophy at Canterbury University College in Christchurch, New Zealand (1937-1945). From 1945 to 1966 he was the head of the department of philosophy, logic and scientific method at the London School of Economics, where one of his more famous pupils was George Soros, today the benefactor of Central European University (CEU). Karl Popper lectured at Harvard University (1950) and worked at the Stanford Center for Advanced Study in the field of behavioral sciences. He gave the annual lecture on philosophy at British Academy; he lectured at the University of London, Oxford University (1961) etc. As a visiting lecturer he gave lectures at University of California and Minnesota University (1961), University of Indiana (1963), in Denver (1966), Emory (1969), Princeton (1963), Washington (1965), at Salk Institute for Biological Studies (1966-1967) etc. He was a member of the Council of the Society for Symbolic Logic, (1951-1955), the International Academy for Philosophy and Science (from 1948), the British Academy (from 1958), an honorary member of the American Academy of Arts and Sciences (1966), honorary member of the Harvard Capitula Phi Betta Kappa (from 1964), President of Aristotelian Society (1958-1959), the British Society for Philosophy and Science (1959-1961), Foreign Associate of the National Academy of Sciences, Washington D.C. (since 1986), etc. He is also interested in music.

In his first fundamental work, Logik der Forschung, which he published being in touch with the Vienna Circle (Wiener Kreis) of logic positivists, Popper rejected their inductive empiricism and evolutionary historicism. He went on to publish The Open Society and Its Enemies, The Poverty of Historicism, On the Sources of Knowledge and of Ignorance, Quantum Mechanics without the Observer, The Self and Its Brains co-authored with Eccles, his intellectual autobiography Unended Quest, and many other works. He was personally acquainted with Albert Einstein, Erwin Schrodinger and with other prominent scholars.

Charles University owes a debt to Karl Popper, who although a socialist when young later became a critic of marxism and was one of the forbidden philosophers. Sir Karl Popper celebrates his 92nd birthday this year. In view of his remarkable work in the methodology and philosophy of science, which has also significantly influenced medicine, particularly the problems of the body and the mind as articulated in The Self and Its Brain, the 3rd Medical Faculty of the Charles University has nominated Sir Karl Popper as Honorary Doctor of Charles University, emphasizing his remarkable cultural, philosophical, scientific, spiritual and political contribution to the world community. Sir Karl Popper embodies the very best that the region of Central Europe contributed to the intellectual history of the 20th century. It is great honour for the Charles University that Sir Karl Popper has accepted our invitation and undergone an arduous journey to allow us to experience, with great gratitude and in genuine admiration, the pleasure of this moment, which will be unforgettably written in the history of Czech higher education. It is a moment as unreal as the return of Nils Holgersson into this world, as the victory of Don Quixote, as the fall of communism, as the presidency of prisoner and auxiliary workman Vaclav Havel. It is a good moment.

Cyril Hoschl, Carolinum, May 25, 1994