



16th International Summer School 2010

European Ph.D. on
Social Representations and Communication
At the Multimedia LAB & Research Center, Rome-Italy

"Social Representations and Sciences"

16th - 27th July 2010

http://www.europhd.eu/html/_onda02/07/18.00.00.00.shtml

Scientific Material



European Ph.D

on Social Representations and Communication

www.europhd.eu

Swiss Monographs in Psychology

Edited by the Swiss Psychological Society

Volume 1

Mario von Cranach, Willem Doise
and Gabriel Mugny (Editors)

Social Representations and the Social Bases of Knowledge



Hogrefe & Huber Publishers
Lewiston, NY · Toronto · Bern · Göttingen

Table of Contents

	Page
Introduction	ix
 PART I. THE SOCIAL BASES OF KNOWLEDGE	
<i>Serge Moscovici</i> The Psychology of Scientific Myths	3
<i>Mario von Cranach</i> The Multi-level Organisation of Knowledge and Action – An integration of Complexity	10
<i>Lenelis Kruse and Susanne Schwarz</i> Who Pays the Bill? The Language of Social Representation	23
<i>Klaus Scherer</i> On Social Representations of Emotional Experience: Stereotypes, Prototypes, or Archetypes?	30
<i>Wolfgang Scholl</i> The Social Production of Knowledge	37
 PART II. SOCIAL SITUATIONS AND THE ACTUALIZATION OF KNOWLEDGE	
<i>Jean Marc Monteil</i> Toward a Social Psychology of Cognitive Functioning: Theoretical Outline and Empirical Illustration	45
<i>August Flammer and Joannis Avramakis</i> Developmental Task: Where Do they Come from?	56
<i>Uwe Flick</i> Knowledge in the Definition of Social Situations – Actualization of Subjective Theories about Trust in Counselling	64
<i>Maria Luisa Schubauer-Leonie, Anne-Nelly Perret-Clermont and Michèle Grossen</i> The Construction of Adult Child Intersubjectivity in Psychological Research and in School	69
<i>Franziska Tschan</i> Social Markers in Written Action-Related Communication	78

PART III.**KNOWLEDGE AND THE SOCIAL-CULTURAL ENVIRONMENT***Ernest E. Boesch*

Culture – Individual – Culture: The Cycle of Knowledge	89
--	----

Gerhard Kaminski

Ecological Psychology's Trouble with Knowledge: One Terrible Example	96
--	----

Luisa Molinary, Francesca Emiliani and Felice Carugati

Development According to Mothers: A Case of Social Representations	104
--	-----

Alfred Lang

On the Knowledge in Things and Places	112
---	-----

Annamaria Silvana de Rosa

Thematic Perspectives and Epistemic Principles in Developmental Social Cognition and Social Representation: The Meaning of a Developmental Approach to the Investigation of Social Representations	120
--	-----

Marie-Noelle Schurmans and Pierre Dasen

Social Representations of Intelligence: Côte d'Ivoire and Switzerland	144
---	-----

Norbert Semmer

One Man's Meat, Another Man's Poison? Stressors and their Cultural Background	153
--	-----

PART IV.**SOCIAL PRACTICES AND THE DYNAMICS OF SOCIAL REPRESENTATIONS***Hanns-Dietrich Dann*

Subjective Theories and Their Social Foundation in Education	161
--	-----

H. Peter Dachler

Management and Leadership as Relational Phenomena	169
---	-----

Ivana Marková

Scientific and Public Knowledge of AIDS: The Problem of Their Integration	179
---	-----

Juan Antonio Pérez and Gabriel Mugny

Social Impact of Experts and Minorities, and Smoking Cessation	184
--	-----

Gün R. Semin and Monica Rubini

Examining the Cultural Constitution of the Category of Person	189
---	-----

Beat Thommen, Mario von Cranach and Rolf Ammann

The Organization of Individual Action Through Social Representations: A Comparative Study of Two Therapeutic Schools	194
---	-----

Subject Index	203
-------------------------	-----

Name Index	213
----------------------	-----

Introduction

This book results from a scientific undertaking, the main aim of which was to explore the social foundations of knowledge. But the book itself can be considered as evidence supporting one thesis developed by some participants in that undertaking who argued that cognitive products are also generated through societal communicative dynamics. Indeed the chapters of this book were initially presented as contributions to the first international congress organized by the Swiss Association of Psychologists. The congress was conceived as a response to the most fundamental social need, the need for communication.

The basic need to be fulfilled was not only the urgent desire of researchers to let colleagues share their most recent results. The essence of the need was also institutional. For many years the Swiss Association of Psychologists has tried to stimulate scientific communication. Important initiatives were the launching of the Swiss Journal of Psychology, the regular meetings of young researchers; their youth being defined through the freshness of ideas. However these initiatives have not always been successful. The Journal went through a crisis and participants in the meetings of young researchers sometimes were not numerous. Furthermore, even after seven hundred years of cultural and linguistic Helvetic pluralism another peculiar phenomenon often happened during these scientific meetings of psychologists: regularly members of linguistic regional groups left the conference room together and this seemed to happen more often when the speaker did not belong to their own linguistic group (p. .05). This strange phenomenon was considered by the Executive Committee of the Association as an instance of communicative behavior which did not fit in the frame of scientific universality. And the members of the Committee who had learned about the cognitive effects of social interactions thought it necessary to further them between autochthonous scholars from different linguistics regions.

As a result of the efforts of the Committee, chaired by Professor Meinrad Perrez, a pro-

posal was accepted by ballot of the members of the General Meeting of the Association. The basic idea was that communication amongst Swiss scholars would be facilitated when using a language foreign to all of them: the English language. But everybody knows that linguistic competence functions differently according to specific communicative situations and the crux of the problem was to create encounter situations which would facilitate the use of the new scientific coin. Which situation would better serve that purpose than a situation in which Swiss researchers would be invited to communicate results of their research to foreigners with whom they share similar interests?

A necessary condition for realizing such a communication situation was to define a theme on which Swiss researchers would surely have messages to communicate. Of course every researcher has many things to communicate, but communication is more effective when a minimum of shared meaning preexists for the participants in the situation. An area of study was therefore defined offering reference points familiar to Swiss and foreign researchers. The members of the Executive Committee thought that social psychology as practised in Berne and Geneva could offer such reference points and therefore three social psychologists from these universities were invited to initiate this series of congresses which should be authentically Swiss but satisfying international standards. It was agreed upon from the beginning that these three social psychologists would receive the necessary funds to invite several foreign colleagues considered by them as first rate interlocutors for the specific theme of the congress.

So much for the social origins of a planned series of biannual international congresses to be organized by scholars appointed by the Executive Committee of the Swiss Association of Psychologists. To stick to the requirements, these congresses should be borne upon a theme researched by several Swiss scholars who have established a network of pro-

fessional contacts with foreign colleagues; their organization should be under the shared responsibility of colleagues of at least two Swiss universities from different linguistic regions; foreign colleagues have to be invited and priority should be given to communications in English.

The authors of these lines were invited to convene the first congress. They agreed rapidly on the general theme of the meeting: social representations and social bases of knowledge. In Berne and Geneva significant bodies of research have been carried out for about twenty years, often in collaboration with foreign colleagues, in the areas of goal oriented action, sociocognitive development, social influence and social representations. At a very general level all this research illustrates the notion that analyses of social interaction conditions and of shared meaning systems are essential for studying exhaustively the basic phenomena dealt with in the aforementioned subareas of social psychology. Such an assumption is also guiding much research in the field of applied social psychology.

Four more specific themes were retained for organizing the main sections of the congress. One important criterion for defining them was the readiness of distinguished foreign colleagues to deliver main contributions on the topic. All these main contributions have been adapted for this book together with other selected contributions satisfying usual criteria of quality and relevance. It is hoped that this procedure will benefit the work of Swiss colleagues through presenting it in a more general framework.

The theme of the first session was epistemological. In his opening address to the congress, S. Moscovici expanded on the opposition between scientific knowledge and common sense or myths. He argued that this opposition persists in scientific thinking itself and gives rise to the creation of "scientific myths". The second contribution to the opening session was delivered by M. von Cranach and proposed a synthetic view on the links between social, cognitive and conative dynamics.

The theme of the second session was concerned with the situational dynamics intervening in the genesis or actualization of cognitive competences and of social cognitions

and representations. In his contribution, J. M. Monteil articulated assumptions on the intervention of such situational dynamics with more current postulates on the neurological bases of cognition. His contribution can be considered as an argumentation in defense of the social and societal study of cognition.

For introducing the third session on cognitions and the sociocultural environment, our colleagues E. Boesch and G. Kaminski attempted to frame knowledge in two broader settings. The first contributor to the session introduced a more cultural perspective and the second dealt with ecological problems.

Finally the embedding of knowledge in social practice was the topic of the fourth session which allowed H. D. Dann to develop his ideas on subjective theories of teachers and P. Dachler to report on the different meanings of leadership in organizations.

The structure of the conference in four main sessions (a fifth session assembled papers without explicit links to the central theme of the congress) provided the organizers with the means to distribute the numerous other contributions according to their links with the invited papers. Of course this resulted in a kind of prototypical classification weighting the different links one single paper could entertain with the themes of more than one session. Only a fuzzy sets logic can generate a satisfying classification system in such cases allowing the same element to be part of different classes. But such a logic is difficult to use when deciding on a timetable of a congress or on the contents list of a book. Therefore we finally decided to introduce some changes in the attribution of papers to the different sections of the book, but each section begins with the invited papers which are followed by a series of related papers in alphabetical order.

Let us conclude with a more personal remark. It was a real pleasure for two Genevans and one Bernese to collaborate. Of course the Genevans are very familiar with what French common sense calls "*le système D*", which is a highly complex way of organizing things unknown in other cultures. As this system seems unfamiliar to German Swiss (von Cranach, personal communication) we were rather concerned about the issue of our collaboration. But if this culture gap has been success-

fully bridged, it is from the efforts and the goodwill of the local organizers, particularly H. Bolliger and G. Ochsenbein, and through the very efficacious assistance of R. Winkelmann. The English of many chapters of this book has been substantially improved due to the linguistic skills of Mary Valach. We ac-

knowledge also very gratefully the financial help of the Swiss Academy of Human Sciences.

Mario von Cranach
Willem Doise
Gabriel Mugny
Université de Genève

The Psychology of Scientific Myths

Serge Moscovici

If it is true that nowadays, in the face of the rising flux of televised images, newspaper prose and works of fiction, science resembles a town with flooded streets, the inquisitive observer, wondering about the reason for this strange phenomenon and the name given to it, must recognize that its notions cannot possibly enlighten us.

We live, and this has to be declared aloud, in a world in which myths are overabundant and freely proliferate. Their vision fascinates us, we speak their language. But why are we attracted towards that world of images rather than towards the world of concepts? To justify this preference we could enumerate the benefits we derive from myths. What do they bring to our lives, our actions, our minds? What do they achieve that could not be done as well or better by science and philosophy in order to inform, enrapture and guide millions of people whom they address and for whom they are created? Our questions remain unanswered and we awkwardly conclude that if myths multiply, circulate and are sold, it is because people are disoriented, badly informed, or because they just love myths. Incoherent and ill-woven as their web may be, they cling to that mass of fables whose magic action bears little relevance to the mystery of the means of communication. To know why is beyond the possibilities of explanation which are ours today.

Unable as we are to explain the strange prosperity of myth creation in general, we are at least able to illuminate them in a particular area where they scandalize: the word is not too strong. Their number has reached such a puzzling eminence as one would judge the thing to be sheer impossibility. I am speaking of scientific myths. Three or four recent examples of the universe, e.g. viruses, left and right brains, the Big Bang, the death of the universe, have combined to make more striking the manifestations of the problem under examination. Their close relationship to one of the most resounding epidemics of recent years; the link between virus and AIDS together with the

worldwide success of books, such as those by Changeux or Hawkins, gives more scope to the prospect of a psychology of scientific myths. This still has to be created, since our science touches upon it only occasionally and in passing, but I think that it has to be taken further and examined methodically.

The very phrase "scientific myths" is as puzzling as a round square or an atheistic religion. It points to the paradox we have to consider as being at the starting point of this psychology. In fact we like to relegate myths into the past. We boast that they have been eliminated by science. They are the remnants of an archaic system of thought which tried to classify the data of reality and apply its own explanations, such as origins or impersonations: phenomena we can now explain much better. The heredity of species, the fecundity of the soil, diseases, the birth of planets and so on, are things we understand fairly well today without the help of occult force, beneficent or maleficent intents. When traces of them are found in a book or in conversation, we fall a prey to an obscure or rather ancient impression recurring in our minds. It has never been erased, but we have rejected it to the point of oblivion and indifference. We have the impression of going backwards and crossing once more a frontier, retracing our steps in time to meet an obsolete system of thought. In doing so, we fail to recognize the difference between this system and science.

This is not noticeable from the contents but from the form when hearing someone say "This is a myth", meaning a belief which is neither true nor reasonable. The same applies to ill-digested, warped or distorted scientific facts. One is led to conceive scientific myths as a deviation from knowledge, and even a pathology of thought either by default or excess. By default, in losing the sense of the limits between a firm thought and a loose thought, a whole truth and half a truth. By excess, when reason yields to its understanding of everything from a single theory which is always com-

plete and sometimes satisfactory in a logical sense. Or, to speak clearly, when explanation is applied without retaliation to everything that exists in the universe. Let us say that the most obvious and least questionable mark of scientific myths is this combination of ignorance of the frontiers and logical completeness. One could even say that their failing is not to have any.

Despite the extraordinary progress and diffusion of the sciences, the myths that one assumed to be relieved of have not been eliminated but are actually prospering. Whilst acknowledging this, it seems more interesting to ask who has shown the way. Who more or less directly conceives myths? Are we dealing with those who François Jacob calls "fanatics or popularizers"? The answer depends on an observation which is in itself questionable. Some myths inspired by biology have been launched into the French-speaking world through books such as Monod's *Le hasard et la nécessité*, Changeux's *L'Homme neuronal*, Gros's *La civilisation du gène*, Ruffié's *Le sexe et la mort*, among others. Popular literature encourages this way of thinking which makes us see myths along the grain of scientific discoveries. These authors are not content with presenting research work and theories which bring to light and explain hitherto ill-understood phenomena. They seem to venture dangerously beyond the boundaries of science proper. They tread in a no man's land which is shaped by a whole corpus of ideas fashioning the no man's image of science and the scientist's image of daily thought. The choice of such terms as "indeterminacy", "relativity", "Oedipus complex" and "black hole" enables them to play on several registers of images. Reverence towards great scientists and the authority which is recognized in these heroes of culture, give those ideas an ascendancy which is not to be denied, even if he who expresses them speaks only for himself. The thermal death of the universe, the duality of left and right brains, neuronal Man with a capital M, the death of the father; we know that these are not scientific discoveries but myths and derivations rather than deviations from the former. As for myth-makers in the modern world, a fine bunch of Nobel Prizes could be found among them.

All this can give offence, I know. Let us confess that things would be easier if one could

say that there are the myths which recede on the one hand, and science which progresses on the other. Here, the poor popularizers and the man in the street elaborating these myths; there, the scientists fighting them. But we have to face facts. The same men produce in one and the same motion both scientific discoveries and myths; a paradox which psychology takes up. Why a paradox? This is a moot question. It could still be avoided by saying that scientists are seduced like everybody else by original images. They have to answer the ultimate questions of life, or else they feel like everybody the lures of publicity and best-sellers. As true as these reasons are, they remain unsatisfactory. Though it is more risky, let me remind you of a demarcation which is seldom put forward today but contains all other demarcations and keeps its energy intact in our culture. *It is not to be denied that science resumes underhand the inveterate distinction between esoteric and exoteric knowledge.* Its location is on the side of the former class of knowledge which, according to Bacon, is presented in a puzzling fashion, taught to those who are qualified for it and understood only by a small number of people. It is privileged insofar as it is credited with the faculty of producing new ideas, so that, all things considered, it represents the only mode of thinking and the correct one, which all other modes of knowledge are not. In other respects, the things dealt with by scientists are surrounded by an aura of secrecy, inasmuch as they are not immediately approachable as things of ordinary experience are, but only now and again.

Explicitly or not, this demarcation states an *interdict of knowing*. On one hand access is prohibited to what is instituted as knowledge apart from the rest, supposed to remain opaque to vulgar understandings. This is conveyed by a widespread conviction: not everybody is capable of grasping scientific notions, or they are reserved for those who have been given special training enabling them to decipher them. It is claimed that one *cannot* know them, yet it is believed that one *must* not know them. And I am convinced that the passage from *you shall not know* to *you cannot know* is the source of many pedagogic difficulties. On the other hand, like philosophies and religions before, the interdict inculcates the belief that it is not only dangerous but im-

possible to divulge this information, these expressions and methods because of their nature. Consequently it is inadvisable and even forbidden to communicate them to the public at large. Spinoza called this kind of communication *ad captum vulgi* or more frequently *ad captum alicujus*. This quasi-prohibition is deeply rooted nowadays when you think of the contempt attached to the words popularization or popular science, or when you see how suspicious the scientists who try to propagate scientific notions appear: an activity which is strongly censured, and hardly tolerated in those of respectable age who are supposed to have spent their creative energy.

Under these two aspects the interdict of knowing is at the core of the psychology which is puzzling us here. For the paradox springs from transgressing it, going beyond the permitted information and producing exoteric knowledge. It expresses this stepping over the demarcation line which is an exigence of culture as well as an event of thought. This is an event which occurs at a given time in the evolution of a field of research when a new world of knowledge emerges, and when experts are tempted to share their discoveries with a wider public and even conquer an authority which they had not before. Though this will to conquer is always conveyed in modest terms, it is nevertheless obstinately pursued. For being recognized by the public brings about some non-scientific benefits which are enough to justify transgressing the interdict that science, as a rule, obeys.

Why make so much of the interdict of knowing?, you will ask. It is because it introduces my point of view. Most scientific theories account for scientific myths by a need for compensation. The latter are pseudo-sciences, destined to answer the questions which have always preoccupied man, be they ethical, philosophical or logical, e.g. the cause of certain diseases, the origin of the universe, free will, and so on. Science has no answer to these questions, but does not prevent us from requiring from it more than it can give and interpret its informations in an unauthorized sense, combining e.g. cognitive science and biology in order to draw conclusions that each discipline alone would reject. Other theories would consider these myths as the results of a work of substitution. The material with which they are created stems

of course from the sciences themselves. But it is used in a different context, taken outside its strict limits. For instance the story of the thermal death of the universe comes from the application of the second principle of energy to the universe as a whole, something which is excluded by thermodynamics. Some evolutionist myths are based on a natural selection which is extended to culture. The effect produced is that of a vast unicoloured coherent system in which shades of meaning are sacrificed and explanations given in blocks without caring for particular facts. Our epoch has pushed to perfection the art of manufacturing ersatz; the falsification is at times difficult to detect. If we wrongly believe that we are liberated from myths, this is because they are based on the same premises as science, but they do not respect the limits fixed by it.

Much is true in these theories, yet, to fathom what is true, reports, interviews and field studies would be necessary. The viewpoint I was alluding to sees in them some tools of communication which allow one to pass from one class of knowledge to another. More exactly, to pass from less familiar esoteric knowledge to familiar exoteric knowledge such as is implicitly circulating through society. One could even contend that, manufactured and perfected with undeniable skill, myths are neither pseudo-sciences whose unreality is unmasked at a given time, nor false sciences which entangle the link of thought to reality. They are *cognitive operators capable of going round the mentioned interdict and transforming two incompatible pieces of knowledge into each other*. Indeed we do not believe our own eyes when we notice how long-lived they are. This is because we neglect an absolutely essential factor motivating the fascination they exert. In fact they open the door to a forbidden world and thought, and they themselves are for their conceptors forbidden fruit.

One of the hypotheses which has been directing our research for a long time is that the object of psychosocial theory is to associate representations and communications. Here and there it has become something banal, taken for granted. However, it is not so banal when we get to the core of the problem and when we consider how the hypothesis is used, but I shall not elaborate on this point because that is, as they say, another story. "To associate

representations and communications" means, clearly, that the former are fashioned in the course of the latter and not shaped beforehand and then selected and diffused, as it is sometimes conceived in human sciences. It does not mean that representations are prepared in order to be communicated in the same way as advertising is. Like money, they acquire shape and value by circulating and have value only as long as they circulate. Without going into details, theory would hold that there are three communication systems, each of which brings about a corresponding social representation (See: Doise, 1987; Farr, 1987; Strauss, 1952).

Roughly, as far as science is concerned, the first system which is common to propaganda and education imposes a representation determined by science and cuts up the existing representations in society about the same reality. Thus, as shown by Vergès (1987), the economic representations taught to pupils during the scholastic year isolate and rearrange the images and notions they had at the beginning. On one hand, owing to a movement of autonomy, economics appears as a field of autonomous representations; on the other hand, owing to a movement of articulation, the ideas and images concerning that reality are connected and concentrated. Consequently, at the end of the year, the items of knowledge relating for instance to consumption, do not simply refer to the act of purchasing but are integrated into a greater coherent field in connection with such items as "goods", "income", "purchasing power" and "standard of living". You observe that at one and the same time the associations between the items are more definite and the vocabulary is contracted, which indicates a stronger cohesion and a comparative isolation of the representation. Without being a double of economic knowledge, it is nevertheless affected by it.

The second communication system which I have called fusion resembles the flux of a contagion, the daily exchange of conversation, rumour, a television programme or a newspaper article which follows events and coordinates them statistically. In this case, the notions and images of science are absorbed and assimilated by the circulating social representations. The result is nonplussing if you consider that it leaves its mark on opinion. Thus on the front page of *Le Monde* of January 7, I can read:

"There is still time to prevent the virus of suspicion producing more severe effects". Or in the literary columns of January 27, about a book by Sternhell: "The Jerusalem historian had announced that he would shadow the downward progress of the virus at the time of Vichy". Here we are not dealing with a metaphor but with a leitmotiv of images that contemporary representations use irreverently and which is understood by everyone. By searching deeper, one notices that they are superimposed on older social and economic images.

I come now to the third communication system called propagation, which aims mostly at harmonizing a group's representations with those of science, reducing opposition and minimizing the discrepancies between them. In short, altering them so as to incorporate novel unusual information into the field of existing notions and judgements. In fact, and here is a precise thesis, this is the system in which scientific myths are born so as to bring knowledge related to the extraordinary and unfamiliar into contact with knowledge related to the ordinary and familiar. Exceptional ideas and facts, think of the Big Bang, of journeys into the solar system, are of incomparable, even puzzling richness. When they break into the system, they sometimes prove disturbing, but in truth they answer a more profound necessity. Now it is a question of converting existing representations so as to attune them to a new vision, e.g. that of psychoanalysis, statistical mechanics or biology. And you cannot convert anything without dramatizing what is routine, using widespread beliefs and practices as moulds, and combining the new elements with the initial representations of daily life. Thus operating an unexpected convergence between two realities belonging to two distinct modes of understanding causes an almost visual contact which makes you grasp things in a new way. The impression which is then confirmed is that of a transformation that makes the esoteric acceptable and intelligible by stripping it of its disconcerting elements. As for instance the scandal of gravity, a force acting at a distance, is covered by the current representation of attraction and repulsion.

If I can affirm substantially that scientific myths achieve a compromise by changing the comparatively unfamiliar into the compara-

tively familiar, I still have to indicate how. This will allow me to give some theoretical substance to the psychology of myths, to pass from the general viewpoint to its particular applications. I shall briefly evoke a law, then specific rules and their concrete illustrations.

Let us then come to the last and sternest exercise which consists in enumerating the operations by which scientific propositions are transformed in contact with social representations and an expert thought is changed into a naive thought directly connected with immediate life and experience. This does not mean giving them a vulgar, popular shape, but arguing, as one used to say, *ex concessis*, sheltered under a shared position and *ad hominem*, taking into account the images and notions of individuals and groups. To that purpose, a repetitive discourse must be given shape, i.e. a discourse repeating what comes from science and common sense, making some occasional adjunctions or suppressions which break its uniformity. Their aim is to cover up contradictions and prepare compromises between opposite ideas. Now the possibility of making compromises, as Bartlett contended, is an exclusive trait of social thought, in any case being discarded by science. No doubt this discourse uses ready-made and second hand approximate phrases. Myths however emerge from it, thanks to an extraordinary collective skill, in order to give full flight to propositions and images without falsifying them, to find unity throughout the representations and to avoid the literality of statements without giving up truth. In fact this discourse can be recognized by the joint use of allusions and compromises. Indeed, having recourse to allusive words: entropy in the myth of the thermal death of the universe, D.N.A. for the myth of genetics, charisma for that of the leader, or to allusive formulas: principle of indeterminacy, $E = mc^2$, discreetly indicates the link to a world of concepts. Only those who know them understand what they refer to, and this very fact gives value to some statements in the eyes of those for whom the allusion conjures up a relationship of thought.

Beyond the device of allusion, here are the four rules of compromise which I think I have observed at work in scientific myths.

- a) The first rule is to use propositions in an equivocal way, changing them into two-

sided propositions, that is having a strange side and a familiar side.

$$= X = Y$$

$$(1) X = Z - [Z \quad Y \\ \neq X \neq Y$$

My first example will be the myth of the thermal death of the universe which always begins with the statement "The second law of thermodynamics is universal". It is well known what the equivocation consists of. To be called universal, a law, i.e. that of gravity, has to apply to every system of physical objects in certain conditions fixed by science. In that case, we can say that we are really dealing with the second law of thermodynamics ($X = Y$). But if, according to the common viewpoint, we have a statement about the universe as a whole, then we deal with another law: not of thermodynamics, but of one of its representations. I shall not dwell on the recourse to equivocation which is so frequent and so difficult to rule out, for no scientific term is so firmly defined that this recourse becomes impossible.

- b) The second rule is to avoid directly contradicting a familiar proposition by avoiding contradicting its implications. Its formal expression is the following:

$$(2) X = Y - Y = Z - [X = Z] - X \neq Z - [X \neq Y]$$

It can be illustrated by the avoidance of the contradiction between two propositions which are found in the myth of the left and right brains.

1. The opposition between the two brains explains the difference between the bio-psychological qualities of individuals, etc.
2. The opposition between the occupations is explained by the faculties individuals have acquired. The implication is that the differences between chemists, engineers and other scientists, and artists come from their training, not from their physiological equipment. The propositions between square brackets are those which have to be covered up without being explicitly pronounced. This appears from the following text, an extract from *The Aquarius Conspiracy* which recounts the myth: "For tens of thousands of

left-brained engineers, chemists, psychologists, and for their more imaginative, more spontaneous right-brained colleagues, drugs were a passport to Xanadu, especially in the nineteen sixties". Here the rule has the consequence that it allows one to distinguish between "right-brained" and "left-brained" occupations with specific traits and list in them well-known, therefore concrete types.

- c) The third rule to bring a "strange" proposition closer to a "familiar" proposition consists in seeming to repeat it, while in fact an apparently negligible expression is added to or subtracted from it.

$$(3) X = Y - [Y = a + b] - X = a - [X \neq Y]$$

Let us resume the myth of the thermal death of the universe. However fictive it may seem, it introduces the notion of evolution into the common representation of a stable intemporal universe. But, as in every representation of our culture in that respect, instead of being neutral, as science would have it, the evolution occurs in the sense of a degradation. And here is the proposition of an English astronomer who, like other scientists, has contributed to the birth of the myth. He affirms that "entropy in the universe must always increase so that all change will eventually cease, and this ending will come in a finite time – the universe is running down and must eventually come to a stop". Thus the first proposition, which is "strange" for science and common sense, at the beginning describes an evolution. A negligible assertion "so that all change will eventually cease" metamorphoses it into a general, fatal evolution at whose termination you again find the universe stable, but, as you know, dead. This changes the common representation of the universe which was hitherto in use, since its stability is a terminal yet non permanent state. But this also changes the proposition of science into a proposition of myth, since it states that entropy in the universe must always increase; an inadequate statement of the law. The second law of thermodynamics in fact says nothing about the universe any more than does the law of minimal action. At most one could find in it an implication relating to the universe, on the condition that one knows to what extent the latter could be regarded as an isolated system.

- d) The fourth rule would be to introduce between two propositions, one "strange", the other "familiar", an assertion cognate with both which, without contradicting the former, becomes incompatible with it by adding information, however negligible, and ultimately safeguarding the latter, that which is already familiar.

$$(4) X = Y - X \neq a - Y = a + b - X \neq Y$$

Here is an example. In the last century, biologists gave up the idea of evolution in a straight line. There is no longer any scale of nature. Instead we are presented with an amply ramified genealogical tree from which we can read the (mostly hypothetic) lines of ascent and descent between the species of living beings. Thus we step from a known representation, that of a fixed scale, to one which is not so well-known, that of evolution. This theory of organic evolution has become the starting-point of scientific and political myths. Therefore you can see what the two propositions which are still incompatible despite the lapse of time would be: on one side the development of a complex genealogical tree of the species, on the other, the linear sequence of living beings. Thus, in everything that concerns the origin and evolution of man, you again find the proceedings which I shall illustrate by an example taken from *L'Homme neuronal*. The assertion cognate with these two biological propositions is borrowed from studies about the development of animals and children. Changeux writes that chimpanzees, like children aged two to four, build up graphic collections or coloured blocks but do not go beyond that stage. Whereupon he asserts: "With man, the development goes on", as if there was an immediate succession and one could pass from big chimp to small man. Curiously the point is made with regard to organic evolution, but in filigree the scale of nature of the common representation is preserved.

That such rules exist conceals a fascinating conclusion. If the irruption of a new myth is a miracle, this miracle really happened through thermodynamics, evolution, psychoanalysis, political economy, and the rest. By compromises as systematic as they were strong, science has metamorphosed common representations, for, despite ourselves, our beliefs

and practices have been upset. It has itself undergone a metamorphosis as its esoteric stock of knowledge has been swallowed little by little, digested and assimilated by the mass of exoteric knowledge. Nowadays we are not even aware of its presence because it has become the limit of our horizon. During this double metamorphosis, neither reason nor logic were respected as they should have been. That is the reason why we are ready to explain its results in terms of errors, of return of archaic elements, of pressure of affects and the debauch of imagination. Thus ascribing those results to prerational mechanisms, as a consequence of a recession and lapse in the work of reason.

This is why the psychology of scientific myths would be a psychology of prerational mental and social life. In my opinion, it is not adequate to view things in such a way, remaining fettered by stereotypes and clichés. Without much difficulty, we can recognize in it neither a disruption nor a recession but a continuation of science by other means when it has reached a certain stage and its discoveries are indispensable if one wants to go beyond by enriching the cognitive and practical possibilities of the majority of people. Between the two branches of the dilemma "nothing but science" and "the science of nothing, i. e., ignorance", there is room for many other alternatives. We have seen that rules serve to create alternative phrases and images shared by scientists and non-scientists alike. If you do not endorse the general contempt for social thought, then you can suppose that we deal with post-rational mechanisms constructing a discourse "ad cap-

tum alicujus" which extends, in a sense, the discourse of reason and science. And which opens up their books of secrets to society at large.

One could surmise that there is a post-rational development of the child who has reached the Piagetian age of reason but does not stop there. This has something to do with the strange proclivity of the mind solicited to communicate with others, to explore reality and discuss truth with the living and the dead. Needless to say, from my point of view, the psychology of scientific myths, if it deserves to be pursued, should open a window on that post-rational intelligence which is no less mysterious than its opposite. I would even say that it is more mysterious since it intervenes every time we have to trespass the limits of what we know and what we do.

References

- W. Doise (1987): *Pratiques scientifiques et représentations sociales: que faire de la psychologie de Piaget?* Cahiers du Centre de Recherches interdisciplinaires de Vaucresson, 3, 89–108.
- R. M. Farr (1987): The science of mental life. A social psychological perspective. *Bulletin of the Psychological Society*, 40, 1–17.
- L. Strauss (1952): *Persecution and the art of writing*. The University of Chicago Press, Chicago and London.
- P. Vergès (1987): A social and cognitive approach to economic representation in W. Doise, S. Moscovici (eds.): *Current Issues in European Social Psychology*, vol. II, Cambridge, Cambridge University Press, 271–305.