Mihail Radu Solcan

Freedom, Minds, and Institutions

The book is built around the idea that total central planning is logically impossible. Instead of starting from individuals and their rights, it uses indirect methodological individualism and takes the impossibility of total planning as the basis from which it reaches until the fundamental plans, the individual plans.

Individual plans, as plans for action, do not isolate human beings. Connections develop as a natural consequence of human actions. Individuals exchange goods or develop common plans for complex actions. Each connection has a weight that helps individuals to compare it with alternative connections.

Working from the bare, abstract concept of a plan and its possibility conditions, the book makes room, in the end, for a richer structure, the network of individuals. It emphasizes the fact that any central intervention in such a web of interactions is bound to be arbitrary.

While the central total or piecemeal planning is lost in the maze of complexity, liberty is a sophisticated, rational way to cope with complexity.

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Freedom, Minds, and Institutions

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There were many opportunities for me, during the last decade, to research, discuss and correct my views on the topic of individual liberty. Many of the results are reflected in this book. It would be hard for me to mention them all, but I will try to make a list as comprehensive as possible.

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My daughter, Ada, and my wife helped me to design two versions of the cover (a colored and a black and white cover). I am not sure how will the cover look like in print, after the editing process, but I appreciate very much their support.

Ironically, socialist[1] intellectuals from the West, who came massively to the East after 1989, were also an incentive for me to prove what seemed to need no proof.

I should add perhaps myself on some ironical list, because my love for free sharing pushed me three decades ago into the rooms of the National Library in Bucharest. My lack of love for money facilitated the involvement with philosophy. Without all these factors, I would probably do today some practical work with computers or other technical devices invented by the human mind, instead of trying to find my way in the labyrinth of the links between freedom, minds and institutions.

It is absolutely obvious that none of the individuals that I have mentioned bears any responsibility for my mistakes. I am the only one who has to take this responsibility, but I have to share the possible merits with many others.

[1] I use this word in Hayek's sense. He has dedicated his book, *The Road to Serfdom*, to the "socialists from all parties"; to the people attracted by the idea that societies are organized or build by central authorities

Introduction

The theme of this book is the rationality of liberty. It has for me a special significance.

I was born under the communist regime. During that time it was unquestionable that anything that is rational in the world of human action is organized[2]; a rational society was an organized society. This idea survived in today's mentality and many politicians would talk about "building a free society".

Two decades ago I was present at the lecture of one of the headmasters of the central party school. He spoke about the role of the unique party in the socialist society. There was nothing special about the content of that lecture. One can find its ideas in the now forgotten handbooks of "scientific socialism". The lecturer, a former manual worker, had difficulties in finding the right words, even when he repeated the dull slogans of the party. One could hardly detect any enthusiasm in what he was doing, with one exception. He began to talk about a world that is more and more complex. He made a pause and his eyes glittered with the conviction that *this* was an irreproachable argument: in an increasingly complex world the role of the party has to increase. This was for him an obvious truth: somebody has to organize the society.

A few years later I discussed with a distinguished sociologist. He despised the uneducated apparatchiks and their rule. He argued that a committee of enlightened experts should organize society rationally.

I have almost completed this book. I relax for an hour; I watch, on a Western TV Channel, a documentary movie about the first cities. Historians from Western universities present their views. In order to show the amazing complexity of a city, the movie starts with images from New York and a comment that what keeps the city functional is a high degree of organization.[3] It continued with other comments emphasizing the role of

[2]The phrase in communist newspeak was "organized framework". Every action needed an organized framework.

[3]The authors of the movie and their consultants, I am sure, have not heard about John

organization. Old ideas are very resilient. They are intertwined with a vision of liberty as highly irrational. A recurrent theme in the movie was that without a unifying central authority complex human groups would simply disintegrate.

This book develops the theory that a rational society is not organized. The roots of rationality are elsewhere, in the rule of individual liberty. There is nothing original about this theory, but I try to examine as far as possible its presuppositions.

In its quest for deep presuppositions the book goes as far as to ignore not only the organization of society, but society itself. The term 'society' refers to an object like 'Pegasus'. The book proposes a refined methodological individualism: all the explanations of human actions have to be rephrased in the language individual actions and actions-as-connections among individuals who form complex networks of agents. Societies are bundles of networks, often kept together by strong force. Their shape is distorted according to schemes or plans backed by power.

Would it be possible that one day a universal plan would organize all human actions into a coherent society? The communist party claimed that it had discovered the science that would permit us to design such a plan. Is this logically possible? The answer in this book is no. The argument is quite simple: the idea behind this plan of action should be an algorithm. But there is a well-known result in the theory of algorithms according to which there is no universal algorithm. The plan cannot be coherent from a logical point of view.[4]

Going back to the topic of increased complexity, we may note that the book exploits the idea – familiar to those who are interested in computer

H. Holland, the father of the genetic algorithm, and his book *Hidden Order: How Adaptation Builds Complexity* (Reading: Addison-Wesley, 1995). According to Holland, the way New York is supplied with bread is a demonstration of an emergence of intelligence in an agent-based system that is not organized by some center.

[4]To my knowledge there are surprisingly few explorations of the implications of these results in the theory of human action. Pierre Lemieux, "Chaos, Complexity, and Anarchy", *Liberty* 7, no.3 (March 1994), pp.21–29, clearly sketches the idea of such a link between the theory of the complexity of algorithms and the theory of liberty. He invokes the results obtained by Gregory Chaitin, which are more powerful than the results of Gödel, Church and Turing, used in this book. Starting from these mathematical results he develops the theme of their implications for the theory of human action. He states that "The planner's dream is inherently impossible"(*ibidem*, p.29). He has also a lot of interesting things to say about the role of mathematics in a new investigation of the foundations of Austrian Economics.

In the philosophy of mind there is a name that has to be mentioned in connection with Gödel's results. It is the name of the Oxford philosopher J.R. Lucas. Of special interest for the present investigation is his book on free will (Lucas 1970).

programming and in cognitive science – that we cope with complexity using modularity and communities of objects. Neural networks have also shown that there is no need to have a central unit in a complex structure that is able to learn.

Liberty is linked in a surprising mode with rationality. The whole investigation that follows starts with a world of choices and continues with a search for rational rules that could govern the world of human action. This is not an empirical investigation of the transition to liberty. No conjectures are formulated. In a world of choices only what-if analyses make sense.

The basic idea is that the computational limits to central planning offer the foundation for an approach to liberty that bypasses the traps of direct individualism. Direct individualism starts with the individual selfownership. We use an indirect approach: start with the logical impossibility of planning and then restrict planning to its proper sphere: individual planning. This opens the way for the rule of private property. Further, we investigate the role of money in networks of agents. Liberty is connected, in this context, with the lack of arbitrary obstacles to entry and exit from networks or the creation and destruction of connections in a network of agents.

POST SCRIPTUM

The book started as a Hayekian enterprise: its main aim was to examine the role of knowledge in society.[5] There is already a literature on the link between Hayek, networks and complexity.[6] During the investigation, however, the focus changed: the significance of the logical impossibility of planning played an increasing role; tacit and practical knowledge also played a minor role, as well as the evolutionary process through which rules are discovered.

Probably, a much better title would be *The Rationality of Liberty*. However, the title remained unchanged. It reflects more the history of the book

[5] There is in Hayek also the idea of the network model of the market (see chapter 10 on page 153 ff. here).

[6] See Birner (1996)for an interpretation of Hayek's work as network-based approach to markets. Butos and J.McQuade (1999) underline Hayek's influence on the neo-Austrian and modern Walrasians; they also focus on the link between knowledge and order in Hayek. For an analysis of Hayek's theory of the mind see Dempsey (1996). Dempsey emphasizes the idea that knowledge creates coherence through cognitive connections. He also points out the role of self-referentiality. Vaughn (1999) discusses the relationship between Hayek and modern complexity theory; it also warns against rash applications of complexity theory to the real world. Zappia (1999) investigates critically the new generation of market socialists.

than its actual content, but it is also sufficiently broad to cover everything that is in the book. The specific result of this evolution is something that one might call a "how to mises a hayek-church"[7] There is also an effort in the book to tell a story that the mainstream economics researcher – with her disgust for ideology and distrust of mysterious tacit, practical forms of knowledge – might read with interest.

[7]The phrase imitates the title of a paper that belongs to the tradition of analytical philosophy: David Kaplan, "How to Russell a Frege-Church", *The Journal of Philosophy*, no.19(1975), pp.716–729. The allusion in our expression is to an infusion of Misesian thought into the Hayekian tradition, on the background of the theory of algorithms developed, among others, by authors like Alonzo Church.

Part I

Action: Form, Meaning and Knowledge

Chapter 1

Action

The Objectives of Part One The book starts with an analysis of human action. We explain which are the reasons for focusing on the individual as a chooser. We concentrate on the *form* of the choice, rather than on the purpose of actions. From this perspective, the Austrian School, with its preoccupation for "purposive action" is more inflationary than mainstream economics.

We call the methodology that starts from the individual and her choices *direct individualism*. This is a convenient strategy for the economist. It creates however difficulties for the philosophers who attempt to attach rights to individuals: they have to look for the proper sphere of the individual (the protected sphere), a sphere with fuzzy and uncertain borders.

The most precious results of this kind of individualist approach are in the theory of value. The anomalies show up as soon as we engage in the analysis of efficiency and of the rules that might constrain transactions on a market.

There is a terminological point that we have to emphasize from the beginning. We use the term 'freedom' in the broadest possible sense. Individuals enjoy freedom even when there are no rules that constrain their actions and interactions. We start with a discussion of the possibility of freedom. All of our discussion, after the first chapter, focuses, however, on human actions and interactions, not on general metaphysical questions. Why not use, in these conditions, some term like 'anarchy', instead of 'freedom'? The first reason is that 'anarchy' suggests that we will end up with some theory of the state and the state is not a problem that we discuss here. The second reason is that we want to keep in touch with the general arguments in favor of freedom, especially with the argument in (Lu-

cas 1970), who is using Gödel's logical results in his theory on the *freedom of the will*.

The term 'liberty', on the other hand, in the book, has always institutional connotations. There are rules that limit freedom of interaction with others. This is hardly more than a trivial truth. But which are the reasons for these rules? Are there rules that would be much more reasonable to adopt than others? Can minds discover and accept such rules? These questions should clarify the principle of the use of the term 'liberty'.

I hope that a confusion between 'freedom' and 'liberty' would also not be very dangerous. The context should indicate when we have to take into account the relationship with institutions or minds. This is the reason for keeping the initial title of the book. It embodies this context in it and should dissipate any ambiguities that might be caused by the terminology itself.

The Problem of Freedom In order to clarify the preliminaries of the enterprise that follows[1] in this book, we will discuss the idea of a world that is neither fully deterministic nor indeterministic.[2] There are sequences of causes and effects. In each sequence the cause is followed necessarily by the corresponding effect. Sequences happen to intersect. Sometimes there might be a necessity in this, sometimes not. There are at least loopholes and spaces for accidents.[3]

One might object to the idea of sequences of causes and say that it is too simplistic. Interesting worlds are much more complex. We may conceive more complex chains of causes and effects: trees of causes and effects. In a tree there are bifurcations. Causal laws at another level of causality however, according to the objection,

[1] John Stuart Mill makes a famous distinction when he writes that the subject of his Essay on liberty "is not the so-called Liberty of the Will, so unfortunately opposed to the misnamed doctrine of Philosophical Necessity; but Civil, or Social Liberty: the nature and limits of the power which can be legitimately exercised by society over the individual"(Mill 1975, chap. I). We do follow up to a point the distinction of Mill. Our subject is not the free-will problem. It is liberty. But we need in our argument a feature of freedom in general. Thus we have to start the argument from a broader perspective on freedom and human action.

[2] In this book we investigate models. Our approach is theoretical. From this perspective, we discuss about worlds in general, not a particular world.

[3] This simply means that there are *genuine* possibilities.

govern each splitting. And the whole world is just a whole complex causal structure.

A possible example would be the human mind. Why did you entertain that thought? According to the above objection, one does not find a chain of causes at the level of the mind. But if we investigate social relations, we would find an explanation.[4]

The answer to the objection is to reverse it and ask what happens when chains at new levels of causality intersect. If we go along with the objection, we have to accept the existence of a new level of causality and so on. We end up in an infinite regression.

Let us cut the regression and accept the existence of events or courses of the events which are non-deterministic.[5] For what follows there is no need for complete chaos. We just have to work only with those worlds that leave room for non-deterministic processes.

1.1 Happenstances

The meaning of action is to make things happen. These things might have happened without human intervention. But without human intervention, they would be mere happenstances.[6]

[4]Thomas Nagel depicts a contrast between an external and an internal view of action. The external view is supposed to be the objective one. What appears to have no cause when one sees things from the point of view of the mind becomes quite determined from the external perspective (see "The Problem of Autonomy" in (O'Connor 1995, p.33)). He is even more challenging when he writes that he changes his "mind about the problem of the free will every time"(O'Connor 1995, p.35) he thinks about it. However, he adds that compatibilist accounts of freedom (those accounts that try to make determinism and freedom compatible) are less plausible that the opposite views.

[5]Some authors said even more than this. They stressed the idea that a world that is completely deterministic is incompatible with responsible action. This seems to be the argument in (Berlin 1969) when he analyzes the idea of historical inevitability. Complete determinism would make concepts such as worth and desert empty(Berlin 1969, p.65). "Determinism. . . rests on beliefs. . . which are implausible because they render illegitimate certain basic distinctions which we all draw"(Berlin 1969, pp.88-89).

[6]Authors who try to work only with causal systems treat them as relative to some point in the history of the universe. Georg Henrik von Wright, for example, in *Explanation and Understanding* (Ithaca: Cornell University Press, 1971), chapter II, claims that causal systems are closed and must be related to a fragment of the universe. The discovery of the causal relations in such a system, according to Wright, has two aspects, a passive one and an active one. From the point of view of the active aspect, human beings start the motion of such systems through the production of their initial conditions. Therefore the causal systems are compatible with freedom. These causal systems are like the causal

1.1.1 An Example

Let us think about an imaginary situation. In the mountains there is a river that flows in a valley surrounded by big trees. One day there is such a storm that uproots trees. The wind is so violent that trees are taken far away. One tree falls however in the river and creates a dam.

A variation may be elaborated on the theme in the above example. Instead of storm we suppose that an earthquake has taken place. Huge rocks fall from the mountain into the river. Again a dam is the result of this process.

All the previous examples illustrate the idea of happenstance. There are chains of causes. The wind blows wildly and this is the cause that explains why trees have been displaced. There is a whole chain of causes behind the river and its course. But the dam is an accident. In this case we talk about a mere happenstance.

The source of the river might dry up before trees or rocks have fallen into the riverbed. Other processes might modify the channel of the river. All this is part of the complex interplay of causal structures.

Intelligent beings exploit the possibility of happenstances.[7] There are two ways of exploiting accidental processes. Animals exploit the possibility of accidents. Humans exploit them too, but in a different way.

Beavers construct complex dams and underwater lodges. They gnaw trees and build intricate structures. They modify the environment. What is otherwise a rather rare accident is produced in a systematic way.

On the other hand, human individuals also build dams. They cut trees or use much more sophisticated procedures in order to make a dam.

In all these cases, processes lead to a change in the state of the world. New structures appear. From a causal point of view they are accidents. Things happen that might not take place.

---

chains that we have talked about. However, we have to take into account the possibility of setting or not setting in motion the respective system. It is there that we locate the space of the happenstances. We reject causality in that point. Robert Nozick wrote that the action of an individual who chooses is ”not (causally) determined, for in that very situation he could have decided differently; if the history of the world had been replayed up until that point, it could have continued with a different action”(Nozick 1981, p.295).

[7] Russell in *Problems of Knowledge* (New York: Simon and Schuster, 1948) wrote that “intelligence could make improbable things happen”(p.54). The idea is suggested by the devil of Maxwell. Daniel Dennett (O’Connor 1995, pp.45 ff.) discusses this speculation of Russell. He draws our attention to the significance of the selection under time pressure of the random productions. This feature of the “time pressure” is very important from an economic point of view and we are going later to take advantage of the economic approach to human action.

1.2 The Concept of Action

Suppose that I come home and I see that a window is broken. I wonder what/who broke the window? It might be the wind. It might be the cat. It might be a human being. Let us concentrate on the human being.

According to the argument formulated above, this is an accident. But, we suspect that an individual contemplated the possibility of smashing the window. He or she deviated some hard object into the window.

One might say that it was a happenstance from a general ontological point of view, but not if we look at the individual who actually broke the window. After all, in normal, everyday English, we would talk about somebody who "causes to happen".

The right answer to this objection is to point toward a duality in the character of any individual. On one hand, he or she must be able to cause something to happen. Otherwise, how can a person change the direction of a rock in order to hit the window? On the other hand, there is the possibility of using in different ways the ability to make things happen.

There is also the specter of regress invoked above. If we explain in a fully causal manner the mind of the individual, we have to engage in finding all the time new layers of causality. Thus, the decision to cause something to happen has a non-causal aspect too.

In the case of human actions, I prefer to talk about the speculation of possibilities.[8] If we anticipate a possibility, we make efforts to be in the best position to reap the benefits when the respective possibility becomes actual. We try to anticipate how others would act if the possibility becomes actual.[9]

Human action is the art of cultivating very improbable happenstances. A diamond is cut and polished in such a way that it is almost improbable to find it in that state in the mines. The combination of letters in this text might be obtained as a result of some computer program that mingles let-

[8] If we speculate a possibility, we are not just selecting from random productions. We might talk about the cultivation of the accidental, but this metaphor is limited. Dennett states that selection is a problem (O'Connor 1995, p.49), but the solution seems to generate voluntarily the results. We also have to expect surprises while we try to speculate a possibility.

[9] Talking about man's actions Rothbard says that "All his actions are of necessity *speculations* based on his *judgment* of the course of future events"(Rothbard 1970, p.6). Speculation is essential for human action. We modify however a bit Rothbard's formulation and refer to a *universe of possibilities*. Individuals are not just anticipating the course of future events. This would might just mean that they cannot predict the future, but the future is somehow *there*. Individuals bring about events; they shape the course in the universe of possibilities. From this perspective there is no course of the events to predict.

ters and other signs randomly. The program, however, would have to run for a very long time.[10]

The toughest task, however, in the case of the computer program would be to choose among the different versions of the text. Humans have this ability. Any human being is able to choose the way of cultivating happenstances.

1.3 Cooperation and Freedom

Why is animal action different? Animals are also able to change the environment. They certainly bring about processes that are quite improbable otherwise.

Toolmaking does not differentiate us so much either. Apes and maybe some other animals are capable to use tools.[11]

Cooperation is another answer that is not very convincing. There are societies of animals. We find there a division of labor. We can also document hierarchical as well as egalitarian forms of cooperation among animals.

It seems obvious that we should turn toward something else. Maybe language or culture would be appropriate candidates? We must take a second look at cooperation.

Cooperation is important because it involves a division of tasks. One individual alone only in principle could achieve a very complex action. Time and deficient knowledge will be formidable obstacles. It is almost for sure that we do not possess the bare knowledge that is necessary for

[10] George Gamow, in the first chapter of his book *One two three... infinity*(New York: Viking Press), mentions an imaginary experiment with a printing press. The output of the printing press is all kinds of possible lines of text. There are 50^{65} possible lines of 65 characters each, if we use only 50 different symbols. This is a huge number. Gamow shows that even if use each atom in the universe as a printing press, we would need billions of years to complete the job. Human beings use meanings in order to find directly the proper line of text.

[11] Jane Goodall became famous for her researches on the use of tools by animals. She believes even more than that. She thinks that "humans are not the only rational, thinking beings on the planet and that we're not the only creatures capable of altruism and self-sacrifice. ... Chimps can reason, solve problems. They have some idea of the future. And they can make plans, and perhaps most important are the similarities in the expression of the emotions. Chimpanzees are so like us, that they blur the line once perceived as so sharp between humans on the one side and non-humans on the other."(Jane Goodall, "This I believe" <http://www.janegoodall.ca/jane/jane_thought_this.html, accessed March 15, 2001>)

replacing in some situations the work of a number of individuals acting together.

The market is the solution when I lack some tool or material. I do not know how to build the computer that I use for writing this text. It would take up too much of my time to construct it from scratch and then write the software and, finally, write the book. The mere knowledge that is involved in the hardware and the software of the computer is tremendously complex. If I have to rediscover everything alone, I am almost sure that it might never happen. The hardware and the software of the computer is tremendously complex. If I have to rediscover everything myself this is almost impossible.

If I buy books on how to build the computer this is still cooperation through the market.[12] It has a lot of obvious advantages.

Market cooperation has also something that distinguishes it from animal cooperation. It opens the possibility of my own development as an individual. This is what we will take to be the main meaning of liberty.[13]

[12]The market is a key feature of human interaction and it is also very significant from the point of view of the problem we are discussing now. If the world of human beings were completely deterministic, then a very intelligent bureaucrat would have just to tell everybody what he has discovered. In this way, there is no need for a plan in the strict sense of the word. All the bureaucrat needs is to transmit the relevant knowledge to the individuals. This should not be a problem since he knows exactly all the deterministic laws of that world. We will show later that such a plan is impossible for logical reasons. J.R. Lucas has shown the impact of the very important logical theorem of Gödel on the problem of determinism and free-will. Lucas exploits the fact that the theorem applies to systems that are sufficiently rich to contain simple arithmetic (with the kind of arithmetic calculations that human beings know how to perform). A human world is such a system. If a physicalist tries to describe it, the description in pure deterministic terms is bound to remain incomplete for pure logical reasons according to (Lucas 1970, pp.130-133). We will use the same type of logical argument in the problem of comprehensive planning and we will discuss the indirect impact on the problem of liberty of the proof of the logical impossibility of planning.

[13]We need here, so to speak, only a minimal result in favor of freedom in the age-old dispute concerning determinism and freedom. Ted Honderich has a site on determinism and freedom at <http://www.ucl.ac.uk/~uctytho/>. On the site there is a bibliography (that came into existence at 1 January 2001) and classical philosophical texts from Thomas Hobbes, David Hume, Immanuel Kant. There are also many interesting contributions from Peter Strawson, Thomas Nagel, John Earman, Galen Strawson, Saul Smilansky, Ted Honderich himself and others. There is also a useful glossary "Determinism and Freedom Philosophy — Its Terminology". For a bibliography on free will, compiled from the point of view of the philosophy of mind, see the bibliography of David Chalmers *Contemporary Philosophy of Mind: An Annotated Bibliography*. It is available on the Internet. Last time I saw it at <http://www.u.arizona.edu/~chalmers/biblio.html> . In Chalmer's bibliography free will is in part 5, section 11. This is the best bibliography on the philosophy of mind. It contains hundreds

As in the case of the computer, I may buy on the market knowledge that I use in my own way. The original producers have no complete idea about the ways of using what they have made. But they create possibilities of bringing about new ways of action. Do other forms of cooperation have the same property of making possible huge varieties of individual development? This is a question that we will examine throughout this book.

of titles with insightful annotations (unfortunately not in the section on free will). Its old address was at ling.ucsc.edu/˜chalmers. Addresses do change on the Internet and this is inconvenient, but one might try a key-word search on Google or some other search engine.

Chapter 2

Choice: Form versus Meaning

In this chapter we move from the problem of free will to the genuine problem of this book, the problem of liberty. The turning point is located in the theoretical approach. We will make a contrast between the form and the content of an action. The aim is to reconstruct the theory of human action as a theory with an *a priori* core.[1] In order to do this we need of course an idea of a form that is suitable for the study of action.

The question "who broke my window?" is not the only one that I may ponder. I might wonder why he or she did this. Maybe it was a mistake. If it was not a mistake why did that individual do this?

[1]The *a priori* character of the (whole) theory of human action has been stressed by Ludwig von Mises. We extract from Mises the accent on the logical character of the theory of action. Mises writes that "The idea that A could at the same time be non-A or that to prefer A to B could at the same time be to prefer B to A is simply inconceivable and absurd to a human mind."(Mises 1966, p.35). Of course, it does not matter what is *A* and what is *B*. From a pure formal point of view we also have no need to take into account the reasons for preferring *A* to *B*. On the other hand, we may interpret Mises's position on the categories of action as a Kantian approach to human action. He writes characteristically that "All the praxeological categories are eternal and unchangeable as they are uniquely determined by the logical structure of the human mind and by the natural conditions of man's existence. Both in acting and in theorizing about acting, man can neither free himself from these categories nor go beyond them. A kind of acting categorially different from that determined by these categories is neither possible nor conceivable for man. Man can never comprehend something which would be neither action nor nonaction"(Mises 1966, p.198). We do not make any assumption that the logical structure of action is determined by the structure of the human mind. Our position is that any intelligent being that would speculate happenstances and interacts with other forms of intelligence in this process is bound to come under the same kind of formal constraints in their actions. As the argument in the book unfolds, it will be more and more apparent that interactions and their structures play a key role in the determination of the formal constraints of action.

Was this a form of protest? If it was, were other forms of protest possible? Writing a letter, for example, would be an alternative.[2]

When we talk like this about the "form of an action" we point toward the manner or even the means used in order to attain an aim. It is not, however, this sense of "form" they we intend to work with. We work with a sense that resembles the use of "form" in logic.[3]

2.1 Content and Form

We have received the tax forms or some other kind of document that has spaces that we have to fill. Another example would be a telegraph form.

Of course, there is no problem to understand what means to fill the tax form.[4] We all have problems with the specific details of the content that we put in that form. Filling the telegraph form, though now a somewhat unusual experience for many of us, is also unproblematic. The message

[2]The example is inspired by the discussion in the third chapter of Georg Henrik von Wright's book *Explanation and Understanding* (Ithaca: Cornell University Press, 1971). Wright analyzes the opening of a window. In order to find out what the agent did he points to her intentions. She intended to refresh the air, for example. Wright offers an analysis also of practical syllogisms. Practical syllogisms have premises that include "intend" and "believe" as key words. According to the distinctions that we propose here this might be a formal semantics of action, but it is not part of the syntactic-like analysis of action. For Wright, social sciences are hermeneutic. We believe that there is a formal non-hermeneutic theory of action.

[3]The "if..., then...", for example, are the "marks" of the logical form of certain sentences. Let us now examine three sentences of this form. The example is from Winfried Karl Grassman and Jean-Paul Tremblay, *Logic and Discrete Mathematics: a computer science perspective* (Upper Saddle River, N.J.: Prentice Hall, 1996), p.2.

1. If the demand rises, then companies expand.
2. If companies expand, then they hire workers.

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3. If the demand rises, then companies hire workers.

The logicians look at the form of the sentences. If somebody accepts as true the first two sentences, then she must accept the third as true. Otherwise, she would contradict herself. There is no need to investigate empirically this fact. The inference is valid on formal logical grounds. The economist, on the other hand, might not accept the truth of the premises. He might invoke empirical researches against the first two sentences, but not against validity. What we claim here is that there are forms of the human action too. The formal theory of action is like formal logic, it does not appeal to the court of experimental results.

[4]See above note 3 on the current page for the idea of "logical form of a sentence". We obtain specific sentences filling in an adequate way the gaps of logical forms.

that we want to transmit is the content.

Let us suppose that we walk in a shop and see a display case. The collection of elements that are in the display case is the content of the display case. This has shifted us however from the idea of content as message or data. This is concrete content.

Logicians just go in the other direction toward more abstract form and content. We still have the idea of empty spaces that we have to fill. But unlike the telegram form or an application form, the text with empty spaces is made up exclusively out of logical words. Such logical words are "and", "any"and so on. The logical connector "if ...then ..." is also an example of a minimal logical form.[5]

We fill a logical form with propositional content. Now, when we talk about "propositional content", we have just an abstract idea about its nature. It is something that is true or false.[6] We do not need specific propositions.[7] We need the idea of filling the logical form with content.

2.2 The Formal Theory of Action

2.2.1 Choice as Form

Let us see if we can adapt the idea of logical form to action. We start from the concept of action as speculation of possibilities.[8]

Now we can build a very simple model. We will call it the "choice point model". In this model the universe of human action is made up of various points. At each point, the individual has a choice among different courses of action.[9] Let us call the possibilities of action for an individual,

[5] See note 3.

[6] This is the idea of a logical semantics in a nutshell. From a logical point of view, semantics, as well as syntax, is a formal investigation.

[7] Concrete, specific proposition are the object of investigations, empirical or not, that are outside the scope of logic.

[8] This *terminus a quo* is significant. The presupposition is that there is a genuine choice at that point.

[9] Again we try to distill an idea from Mises. Mises writes that "the act of choosing is always a decision among various opportunities open to the choosing individual. Man never chooses between virtue and vice, but only between two modes of action which we call from an adopted point of view virtuous or vicious. A man never chooses between 'gold' and 'iron' in general, but always only between a definite quantity of gold and a definite quantity of iron. Every single action is strictly limited in its immediate consequences. If we want to reach correct conclusions, we must first of all look at these limitations"(Mises 1966, p.45). Mises talks about a principle of methodological singularism. We emphasize these singularities of human action through the use of the term *point*.

at a given point, the "choice set".[10]

We may compare the form of the choice with a long tape with empty slots. To "fill" this form means to put some action in the first slot, then look at the rest of the choice set and fill the next slot and so on.[11]

The metaphor of the tape with slots has an inconvenience. In real situations, only the first slot is filled.[12] A more appropriate metaphor seems to

[10] The notion is analogous to the "opportunity set" of the economists. David Friedman writes that the "**opportunity set** can be thought as a list containing every bundle that you have enough money to buy"(Friedman 1990, p.40). The difference is in the content of the bundles. Usually, for the economist, they are collections of goods and services. Our bundles contain only possible actions. The difference is very small, but we want to place the whole discussion at a higher level of abstraction. There is also another difference: money has a place in our models only in the second part of the book, at a different level of analysis.

[11] Nozick (1981, pp.294 ff.) uses a model with weights on *reasons*. Reasons, according to the view that we will adopt here, give meaning to actions. The hermeneutic of specific reasons is however the task of non-formal investigations. The historian, for example, may study the influence of ideas on reasons(Nozick 1981, p.295). He develops an approach focused on the meaning of action, but within the limits of a formal approach. The weights on reasons play the same role as the kind of hierarchy that is used in the choice point model. In our model however we do not represent in any way motives, reasons or intentions. Even aims are, so to speak, "bracketed".

[12] Choice points are like the possible worlds of the logicians. For an encyclopedic overview of logical techniques see D. Gabbay and F. Guenther (eds.), *Handbook of Philosophical Logic*, first edition (Dordrecht: Reidel, 1983-1989). The first volume is dedicated to classical logic. The second volume is an introduction to the extensions of classical logic. See Robert Bull and Krister Segerberg, "Basic Modal Logic" for an introduction to the concept of *possible world*. They write that we may call possible worlds "more neutrally, *indices*, or even just *points*"(p.15). The relation between possible worlds is called "accessibility relation" or "alternativeness relation". Kanger, Hintikka and Kripke developed semantics for modal logics using possible worlds and relations among them. Kripke has been the most influential in this respect. His paper "A Completeness Theorem in Modal Logic," *Journal of Symbolic Logic* 24, no.1 (March 1959): 1-14 had a tremendous impact on contemporary philosophy. It seems that its ample use of mathematics did play a significant role. This is not without interesting parallels in economics. He asserts characteristically that there is no need for an analysis of the concept of "possible world", beyond that offered implicitly by the formalization itself (p.2). A proposition is necessary if and only if it is true in every possible world. With the help of the properties of the relation between possible worlds we may tailor the set of worlds over which we "extend" our *every*. Thus *every* does not mean "every world in the universe", but "every world in a suitable portion of the universe". This gives rise to a very useful and flexible technique for the identification of various types of necessity and other modalities. The second edition of the *Handbook of Philosophical Logic* is now going to be published by Kluwer. It is projected to have an impressive number of 18 volumes. What has changed? There is a lot of material covering topics that are useful in computer science. The connection with computer science is now very important. The impact of computer programming and its concepts can be felt (we hope!) despite the informal manner of discussion in the models

be the push-down stack of the computer scientists. At a given moment, an individual extracts just the top of the stack.

If we take something from the top of the stack, then there is the next element in the stack and so on. There is a hierarchy of the components of the stack.[13]

Summing up, the basic idea of this first model is simple: at each point, an individual chooses a course of action.[14] This is a formal view of action

that we analyze in this book. In the second edition of the *Handbook* basic many-valued is introduced by Alasdair Urquhart. It is interesting that he starts with a discussion about Łukasiewicz and future contingency. Łukasiewicz engaged in a long battle with conceptions that claimed coercion is inevitable, under its *physical* or its *logical* form. Thus he rejected determinism and fought against the straightjacket of Aristotelian logic. He paved the way for alternative logics as tools for "liberating people from the tyranny of rigid intellectual systems"(vol.2, p.249). Bull and Segerberg's "Basic Modal Logic" is, in the second edition, in the third volume. Now, going back to our analysis of actions, we might say that in a certain possible world w it is true that action A is on the nth position for the individual x. But, in the actual world, individuals perform only one of the possible actions.

There are some questions still pending. Why talk about *points*? Why this insistence on the *performance* of an action?

First of all, points are what they seem to be. They are reference points (see above the remark on their use in modal logic). It would create a lot of confusion to talk about the "context" of a choice when we want to keep the discussion formal and abstract.

Beyond this, there is a point that Nozick stresses very aptly: "We do not always act on what was a preexisting strongest preference or motive; it can become strongest in the process of making the decision, thereafter having greater weight…than the reasons it vanquished"(Nozick 1981, p.297). If we bracket reasons, than it makes a lot of sense to look at the actual performance of an action. Actual performance is the sign that the individual has chosen.

[13]This kind of hierarchy takes stock of the usual concept of scale of values. For example, Mises notes that "It is customary to say that acting man has a scale of wants or values in his mind when he arranges his actions. On the basis of such a scale he satisfies what is of higher value, i.e., his more urgent wants, and leaves unsatisfied what is of lower value, i.e., what is a less urgent want"(Mises 1966, p.94). The difference is that we place the scale of values in a possible world, rather than in actual human minds. We want to emphasize the purely formal character of the approach. We also separate the formal examination of human action and the analysis of the minds and their impact on human actions and interactions.

[14]Please pay attention to the following fact. If A is preferred to B at point w_n and B is preferred to C at point w_{n+1}, it does not follow anything about the relation between A and C. At the two points there might be different individuals. Even if the same individual is involved, we have not assumed yet anything about the transition from point w_n to w_{n+1}. Mises places characteristically the whole discussion in the context of the role of time. He writes that "…that two acts of an individual can never be synchronous. If in one action a is preferred to b and in another action b to c, it is, however short the interval between the two actions may be, not permissible to construct a uniform scale of value in which a precedes b and b precedes c. Nor is it permissible to consider a later third action as

because it does not matter what specific action is performed. What matters is the existence of a hierarchy of the actions.[15]

2.2.2 The Meaning of an Action

In everyday talk, we associate meaning with messages or ideas. We look for the message of a sentence. We also try to figure out the meaning of all kinds of signs that we encounter in books, newspapers or on the streets. We look also for the idea toward which the text that we have in front of us is pointing to.

On the other hand, philosophical discussions about the meaning of words tend to be very intricate. If we simplify a bit, there are two main types of theories about meaning. On one hand, there are theories that posit some realm of objects in order to explain meanings of words. Words correspond to an object and thus acquire a meaning. "Object" here has, of course, a very general and abstract significance. On the other hand, there are theories that connect the meaning of words with actions. Meanings are revealed in the process of acting.[16]

If we talk about the "meaning of actions" there is a serious risk of being involved in a vicious circle if we choose the second type of theories about the meaning of words.

There is an escape however. First, we must observe that when we talk about the "meaning of an action", we discuss things like the "intent" of the individual agent or the aim of the agent.

Let us gloss the example of the broken window. The question about the intent or the aim of the agent is a question about the meaning of the action.

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coincident with the two previous actions"(Mises 1966, p.103). All that we can infer from this, according to Mises, is that value judgments are not immutable. In the terms of our model, they can change from one point to another.

[15]From the formal point of view, in Wright's example all that matters is the fact that an action has been performed. The individual has opened the window and this is enough for us. It does not matter which was the specific aim of her action. Performance demonstrates the form. If other individuals are affected by this action, all that matters is the fact that they accept it or try to avoid its consequences. It is easy to see this from their performances.

If the logician writes p for a variable and P for a sentence and then writes that $P \rightarrow Q$ we have no idea what sentence is P. It does not matter. All that matters, from a logical point of view, is the form.

[16]For an overview of semantics see Mark Crimmins article on this subject in *Routledge Encyclopedia of Philosophy*, CD version (London: Routledge, 1998). Wittgenstein in his *Tractatus Logico-Philosophicus* (1921) is probably the paradigmatic example for the first approach to meaning. This is the main trend in logico-mathematical semantics. Wittgenstein with his *Philosophical Investigations* (1953) is certainly the best illustration of the second type of approach.

In the case of the window, if what caused the effect was a stone, finding the meaning of that action means not just finding who threw the rock, but finding also the aims, the intentions of that person. We want to know if this was an action of protest (directed against me) or a joke or the start of a burglary. It might also be a side effect if there was some kind of fight on the street.

Let us suppose that we want to decide, if in this example, the individual wanted to break in. There was however no actual housebreak. Maybe the individual had some plans to break in? Should we examine the content of his/her mind?

If our research on the meanings of actions is focused not on some particular meanings or kinds of meanings, but on the form itself of the meaning of actions, then we may talk about a formal investigation of the meanings of actions. This would be similar to the formal semantics in logic. In formal semantics there is, for example, a definition of truth, but no study of some specific true sentence of a particular discipline.

In many instances of the argument of this book we focus nevertheless on what might be called the formal syntax of action, not the formal semantics of action.[17]

2.2.3 Methodological Individualism

Breaking the window of a house is a job for one individual. Building the house is, normally, the job of a team. Building requires a complex web of actions. Each action, taken separately, is incomplete.

The work of a team of construction workers is an example of collective action. Is there something specific to collective action? When we say that "the team built the house" is this a shortcut for a much more intricate explanation that tries to clarify what did each member of the team?

The philosophical position according to which every collective action can be explained away in terms of individual actions is called methodological individualism. Methodological individualism should not be confused with ontological individualism.[18] Methodological individualism does not

[17] See especially our treatment of planning. We are interested in the formal logical impossibility of combining actions in a certain way. We do not try to speculate about the intention of the planning center. From this "syntactical" perspective it does not matter what are the aims of the planning authorities.

[18] Mario Bunge, "Ten Modes of Individualism — None of Which Works — And Their Alternatives," *The Philosophy of Social Sciences* 30, no.3: 384-406 distinguishes between ontological, logical, semantic, epistemological, methodological, ethical, axiological, praxiological, historical and political individualism. He criticizes all of them from the

deny the existence of collective actions. The problem is that all explanations of such actions can be done in terms of individual actions and interactions between individuals.

Methodological individualism raises an interesting question in the context of the discussion on the meaning of action. The meaning of an action has two aspects: one is the meaning from the point of view of the agent; the other is the meaning of the action from the point of view of the others. The meaning from the point of view of the others is very important if we try to see how they see the action as part of a wider web of actions.[19]

Extracting the meaning for the others is as crucial a move as it is the understanding of the meaning for the agent when we want to reconstruct the delicate tissue of social relations. But what happens if we would like to reconstruct patterns of actions? We will extend the choice point model in order to make room for an answer to this question.

2.2.4 The Formal Approach to Action

When they check the validity of inferences, logicians work only with abstract ideas of truth and falsehood. The whole idea of coherent and logical reasoning is caught in a net built from basic ideas about forms and truth.

point of view of "systemism". Systemism tries to combine elements from individualism and holism. It would be out of question to discuss all the examples from Bunge. We will examine only the following affirmations: "...to know a human family it does not suffice to know its members: some knowledge of the relations among them and with other people is necessary as well. In general, social facts can only be understood by embedding individual behavior in its social matrix and by studying interactions among individuals. The composition and the structure of a system are just as inseparable in social matters as in natural ones"(p.394). Now, what means to know the members of a family? We have to know their actions. The idea of action plays a key role in this context. We try to know the actions and re-actions to the actions of others. In this way we know the interactions. The phrase "social matrix" has no meaning at all. Actions are actions of individuals. We will also talk later about "connections" among individuals. But these "connections" are nothing but possible actions. They have no independent existence. There is also another important point here. If we adopt a formal approach without methodological individualism, then it will be very difficult to know what actions we are talking about. Without methodological individualism we have to look for "context" and meaning in order to identify actions. Bunge seems to forget that this is *methodological* individualism. There is no ontological commitment here. We build layers of explanations and inevitably we have to cut and simplify. Otherwise, complexity would overwhelm us.

[19]Ludwig von Mises stressed the key role of meanings in the detection of the character of an action. "It is the meaning which the acting individuals and those who are touched by their action attribute to an action, that determines its character...The hangman, not the state, executes a criminal. It is the meaning of those concerned that discerns in the hangman's action an action of the state.(Mises 1966, p.42)"

Is it possible to analyze in the same way the patterns of complex chains of actions?

In the case of inferences, we check validity. We want to be sure that, following the respective form of reasoning, we always reach true conclusions when we start from true premises. There are no "true actions". Thus a choice is not leading to "true" actions.

A choice leads to desirable actions. Our actions or the actions of the others are desirable, less desirable or undesirable. Choice simply tells us that the respective action is desirable for the individual at a certain point.

All this should be seen from the perspective of a formal syntactic-like approach. All that counts is the syntax of the choice, not the reasons, the aims, the intent or the interpretations that we give to the actions involved. The approach is strictly formal.

The desirability or the undesirability of the actions of the others will be seen in the same formal way. It is only important to see things in the perspective of an individual that avoids or does not avoid the actions of the others. As in the case of her own actions, the individual has a choice.

2.3 Interactions and Unintended Consequences

The formal theory of action raises an important question concerning the problems social science is dealing with.[20] To What kind of knowledge leads this formal approach? Are we able only to identify patterns of action? What about predictions or explanations involving specific actions, concrete actions, not just form?

Choice is not like physical movement. If you have the relevant data for the position of the Moon, then you can fill the adequate variables and

[20]Karl Popper had a very important contribution from this point of view. He showed that science has no "object". Science is problem-solving. He writes that "*...science starts only with problems.* Problems crop up especially when we are disappointed in our expectations, or when our theories involve us in difficulties, in contradictions...Moreover, it is only through a problem that we become conscious of holding a theory. It is the problem which challenges us to learn; to advance our knowledge; to experiment; and to observe" in *Conjectures and Refutations* (London: Routledge, 1989), p.222. This text was first published in 1963. In the version of the respective chapter that Popper presented at the 1960 International Congress of Logic he even stresses that "we do not merely want truth — we want more truth, and new truth...what we look for is *an answer to a our problem*...Only if it is a clue, an answer to a problem — a difficult, a fertile problem of some depth — does truth, or a conjecture about the truth, become relevant to science"("Truth and the Growth of Knowledge," in Ernest Nagel, Patrick Suppes, Alfred Tarski(eds.) *Logic, Methodology and Philosophy of Science* [Stanford, California: Stanford University Press, 1962] p.291).

compute its next position and so on. Nothing like this exists in the case of choice.

2.3.1 Unintended Consequences

There is something that social science can do. Suppose that someone is going to take a certain course of action. Then, it is possible to say, for the given course of action, what are the consequences from a formal point of view.

Some of these formal patterns are trivial. Of course, if you invest money you might either lose or gain (or just remain with the same sum of money). No one would be interested in hearing such straightforward applications of simple natural logic.

Each action has consequences. Individuals intend to obtain certain consequences, but their actions generate reactions and the whole chain, according to what we have said already, has unintended consequences. The proof that there are such unintended consequences requires however a careful examination of the possible patterns of action.[21]

2.3.2 Interactions

The real problem for social science is the web of complex interactions that have unintended consequences. Despite the lack of the kind of predictions that natural science offers us, social science has its own interesting answers.

Summing up, the real problem for social science is not the individual action, but interactions of individual agents. Its approach is formal in a peculiar sense. It is focused upon the form, not the content, of the individual choices.

[21] Popper uses this terminology. He is writing about "unintended consequences". For Popper, "an action which proceeds precisely according to the intention does not create a problem for social science…"(Popper 1945, 2: 96). But, without problems, social science, as any other science ceases to exist. Popper is arguing in the context of his critique of psychologism. He is also rejecting what he called the *'conspiracy theory of society'*. According to Popper, conspirators, founders and so on do not consciously design social institutions. They are "the undesigned results of human actions"(Popper 1945, 2: 93). See also(Popper 1957, p.65) for the same idea. I prefer Popper's terminology. Of course, one should note that the idea of an order in society that is the result of human action, but not of human design goes back to Scottish Enlightenment. (Hamowy 1987) is an excellent monograph on this topic.

Chapter 3

Value, Price, and Cost

We think that one can found the formal theory of action in economics. What we try to do here is to study the foundations of economic theory. It is our conviction that we find in economics a real theoretic approach.

We think that the very idea of the formal character of the economic theory of action can be found in the work of Ludwig von Mises. Our enterprise is not, however, an interpretive one. Our aim is not to reconstruct the foundations of Austrian economics.

Our focus is on the problem of liberty in society. We use the term 'freedom' as a name for a broader concept. This concept is appropriate, for example, when we talk about 'freedom and determinism' or 'free will'. We use the term 'liberty' as a name for the freedom in an institutional context. This is not a vital distinction from a theoretical point of view. It is useful when we have to point precisely to the problem that we investigate. We find, for example, the Austrian approach extremely illuminating for the study of liberty, but this does not exclude the use of any interesting idea from economic theories of a neoclassical flavor.

We are deeply interested by the economic way of thinking about liberty. We are not involved in the solution of internal disputes in economics.[1]

[1]The relationship between results and methodological strictness is here exactly the inverse of the one ascribed by Donald N. McCloskey to practical economic research. McCloskey argues that genuine economic rhetoric is far from pure methodology. Economists are interested in the results of the research. We are interested in standards, both of research methodology and of institutions. McCloskey, for example, claims that models are metaphors. Despite our exclusive use of natural language in the book, we hope that our models have a logical structure that goes beyond any metaphorical content. We would

3.1 The Value of Action

3.1.1 Goods as a Web of Actions

Every good involves actions. The piece of furniture on which I am sitting now is the result of many actions. There are the actions of those who produced the materials. Then somebody made produced the multifunctional kit of which this is a part. One must not forget the merchant who sold it to me. I am also continually adding something to it. I combine it with other pieces and make a bed out of it. I separate it and make a stool. The piece of furniture as a good is not physical object, but an web of actions.

Services are also, obviously, webs of actions.[2] This is the economic way of thinking about goods and services. It has all the advantages of a unified treatment. All questions about value and so on are not going to be asked twice, following a useless distinction.

Speaking is also a kind of action as philosophers have pointed out. This is obvious in some cases. If I am "in charge" and I say that your name is now X, I change your name. This is an action.[3]

Thus when we talk about liberty, the main problem is freedom of action. A unified view of goods, services and speech as action is crucial for a unified view on liberty. There is no separation between freedom of speech

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accept however McCloskey final requirement that philosophy should not pretend to legislate in economics. It should try to reconstruct and analyze. For details see Donald D. McCloskey, "The Rhetoric of Economics," *Journal of Economic Literature* 21 (June 1983): 481-517.

[2] I am especially sensitive to this problem because, when I was a student, in Romania, there was in many handbooks of economics a distinction between the "production of goods" and the "services". Presumably, the merchants did not add anything to the "value" of the goods they sold. They just performed a "service". I find this distinction particularly harmful. There is also no need to say that it was associated with the planning system of the communist regime. Its only "merit" might be that it makes tradesmen and intellectuals feel a bit solidary – as opposed to the usual situation in Western societies. According to the above distinction, intellectuals too were not in touch with "real production". They had to be sent for a while "in production" (this was the *newspeak* standard phrase!) in order to be transformed into unalienated human beings.

[3] It is interesting that it took philosophy a long time to discover this. J.L.Austin discovered the phenomenon in the last century. Thus he created a whole school in contemporary philosophy of language. Austin started with the identification of a class of *performative utterances*. These utterances satisfy two conditions: they are not true or false; they are part of an action. One of Austin's examples is: " 'I name this ship the *Queen Elizabeth*'—as uttered when smashing the bottle against the stem"(J.L.Austin, *How to Do Things with Words* [New York: Oxford University Press, 1962], p.5). Austin characterized some performatives as *contractual* (for example, 'I bet…'), others as *declaratory* (as 'I declare war') and so on (see *How to Do Things with Words*, p.7 ff.).

and freedom of action in this approach to liberty.

3.1.2 Value from a Formal Point of View

From a formal point of view, value — the value of an action — is demonstrated by choice.[4] There is, abstractly speaking, a space of choices. In each point of this space, an individual has a choice among different actions.

At each point of the abstract space an individual can choose just one action. As we pointed earlier, for each point and each individual there is a value stack. Actions are ordered in the stack, but only the action on top is executed.

From each point we may define a tree of actions. Each point may be taken as the root from which one or more other trees are starting at the end of the branches and so on. The tree structure means that we are never confronted with exactly the same choice. At least the point of the choice is not the same.

The trees described above are only structures of potential actions. On each tree, after a number of choices, we find a path. It is along this path that we find the chain of actual actions.[5]

[4]Murray Rothbard argued convincingly in favor or the *demonstrated* preference. The alternative phrase is "revealed preference", but historical accident has given different meanings to these phrases. "'Revealed preference' – preference revealed through choice – would have been an apt term for our concept. It has, however, been preempted by Samuelson for a seemingly similar but actually quite different concept of his own. The critical difference is this: Samuelson assumes the existence of an underlying preference scale that forms the basis of a man's actions and that remains constant in the course of his actions over time. Samuelson then uses complex mathematical procedures in an attempt to 'map' the individual's preference scale on the basis of his numerous actions"(Rothbard 1956, pp.5–6).
Beyond Rothbard's argument, we have our own reasons to shun the use of "revealed preference", because we focus on a formal approach. There is nothing behind an action that has to be *revealed.* Mental contents are bracketed.

[5]The universe in which our actions take place is an universe of potential courses of action. In a very interesting essay, Hillel Steiner develops a series of reflections on liberty that might be contrasted with what we try do here. Steiner's argument is far too complex to be dealt with in a footnote. There is a point that deserves however full attention in this moment. Steiner claims that there is a "Law of Conservation of Liberty…What I am free to do is a function of the things possessed by others. My total liberty, the extent of my freedom, is inversely related to theirs. If I loose possession of something, someone else gains it and thereby gains the amount of freedom (whatever it is) that I have lost"(Steiner 1994, p.52). I would call this an *actualist* view of liberty. According to our interpretation, Steiner is focusing on possibilities of action in an actual world. In contrast, we focus on a universe of possible worlds. If I miss the possibility to act in a

Value is the value of an action, for a definite individual at a certain point. It is demonstrated by the fact that the individual executes the respective action.[6] The individual has chosen the respective action and not the other possible actions, at that point.[7]

Let us suppose that the individual *x* drinks fruit juice. She mixes apple juice and grapefruit juice. She has already half of glass of apple juice. What means that she "prefers in this moment more the grapefruit juice than the apple juice"? If she chooses to add a quarter of glass of grapefruit juice rather than half of glass of more apple juice, then she values more the quarter of glass of grapefruit juice.[8]

Talking about values is nothing but talk about action. Marginal value

certain way, this does not mean that someone else automatically has that possibility. Let us think about the actual world in a dynamic way. This is not a fixed point in the universe. The actual world changes and, probably, this is what we describe as time. But, there is something even more important that happens right in the moment I write these lines. I write the lines in the actual world, but I may refer to some possible world, maybe one that is never going to be the real one. To take a more mundane example, if I lose an idea or an insight, this does not mean that someone else is going to have it. I may also lose a trade opportunity. Again, this does not mean that someone else is does benefit from this. Having this contrast in mind, it is no surprise that Steiner writes: "Freedom is the actual and subjunctive possession of physical things. And a person actually or subjunctively possesses a thing if nobody else does"(Steiner 1994, p.41). Steiner stresses the distinction between *compossibility* and *incompossibility* of actions. This is a key distinction for his argument. For a typical formulation of the idea see(Steiner 1994, p.37). Of course, it has, as we have pointed out a clear flavor of actualism. In contrast, one might call our position speculativism. For him, actions are events(Steiner 1994, p.35). We would rather stress that acting means bringing about events. Action is more like shaping and speculating the possible than sharing actuality.

[6]Mises explains quite well why value is demonstrated by action: "Value is not intrinsic, it is not in things. . . . Neither is value in words and doctrines. It is reflected in human conduct. It is not what a man or groups of men say about value that counts, but how they act. The oratory of moralists and the pompousness of party programs are significant as such. But they influence the course of human events only as far as they really determine the actions of men"(Mises 1966, p.96).

[7]David Friedman has a nice illustration for this principle. He argues that "if we observe how people behave with regard to their own lives, we find that they are willing to make trade-offs between life and quite minor values. One obvious example is someone who smokes even though he believes that smoking reduces life expectancy.. . . In discussing the trade-off between the value of life and the value of the pleasure of smoking, my evidence that the two are comparable was that people choose to smoke, even though they believe doing so lowers their life expectancy"(Friedman 1990, pp.21-22, 24-25).

[8]Of course, the fact that the individual chooses among limited quantities of goods is significant. This is the singularity of human acts Mises is talking about. The hypothetical individual does not chose among grapefruit and apple juice in general. It is also significant that at a certain point she might have already a quantity from a given good, as in the case of apple juice in our example.

is so important because it is connected with action. Individuals are finite beings. We might conceive a finite being that might drink all the apple juice in the actual world because the actual quantity of apple juice is finite. This is not true however for all the possible apple juice or juice in general. Thus it only makes sense to think of action in terms of marginal value. Values are a way of describing the formal structure of the path of actions.

In the example given above, one can see how important is that we refer to a certain point in the space of choices. On the other hand it is significant that we can alter the quantity of juice in an almost continuous way. We can add or subtract very small quantities of juice.

We can add, at limit (or margin), a very small quantity of juice. Historically, this approach facilitated the marginalist revolution in the nineteenth century. The marginalist could both overcome the difficulties involved in the evaluation of all the apple juice and all the grapefruit juice and they also were able to use the mathematical tools of calculus.

There were sharp criticisms against the marginalist revolution. One stems from the old institutionalist school. Veblen saw marginalism as a kind of "consumerism".[9]

No old institutionalist idea is involved when we will write later about institutions.[10] We look at value from a formal point of view. If some context, institutional or not, counts, this is simply caught in an abstract way in the idea of choice point. Each choice takes place at a given point. But it does not matter what makes that point different from the point of view of the content of the context.

Our reconstruction of the idea of value lacks however a familiar trait in usual marginalism.[11] Strictly speaking there is no equality of value or, to

[9] Thorstein Veblen, "The limitations of marginal utility," *The Journal of Political Economy* 17, no.9 (November 1909): 620-636. He thought that the marginalist approach reduces value to valuation, thus locking the whole discussion in the context of distribution. For him, institutional change in the life of a business community is the key that leads to real understanding. The institutions are conventions, habits that evolve historically. Their patterns cannot be captured abstractly by pure theoretical means.

[10] There is a difference – one should note – between an old and a new institutionalism. Ronald Coase explains that Oliver Williamson coined the phrase 'new institutional economics' in order to differentiate an approach that originates in Coase's own work on the firm from the approach of Veblen, Mitchell or Commons(Coase 1998, p.72). The new institutionalism stresses the importance of the costs of management, organization and transactions. These are costs that determine the fate of different rules that constrain human interactions. They explain the rise and fall of various human organizations and institutions. For a monographical survey of the new institutional economics see(Eggertsson 1990).

[11] Indifference curve analysis figures however on the list of Oskar Morgenstern of crit-

put it other way, indifference.[12]

Let us explain in detail what we mean with the example of two glasses of juice. There is a glass of three quarters apple juice and one-quarter grapefruit juice and a glass with less juice, but with a mixture of half a glass of grapefruit and a quarter of glass of apple juice. Let us suppose that for x they have "equal" value. However, she drinks one of the glasses. Next day, she has the same choice. She drinks from the other glass. The choice is repeated for a while. She seems to flip a coin in order to make a choice.[13]

If we want to reconstruct, in this model, the mainstream economics concept of equal value, then, in order to define indifference, we need the notion of a relation among choice points: the points at which the choice is made are different; the next move would be to work with the idea of a transition relation from one point of choice to another point that has associated with it a similar choice set. The individual takes the decision "flipping a coin".[14] If we assume that the relation among points has such properties that make irrelevant the fact that the individual chooses something first, then we get indeed the points of an indifference curve.[15]

We find a lot of indifference curves in mainstream economics. There

ical problems of economic theory. He points out that the theory of indifference curves *assumes* the existence of markets.(Morgenstern 1972, p.1179) He also underlines the fact that some individuals have finer value scales than others.(Morgenstern 1972, p.1182).

[12]We try to keep our reconstruction as close as possible to the Austrian version of economics. The Austrian school might be compared with constructivists in mathematics. Constructivists use only a restricted set of methods of proving. In contrast, mainstream mathematics uses an unrestricted set of proofs. The Austrian school rejects, in a similar manner, many constructions and methods used by mainstream economics.

Mises is quite explicit in the problem of indifference curves: "A sound economic deliberation must never forget these two fundamental principles of the theory of value: First, valuing that results in action always means preferring and setting aside; it never means equivalence or indifference. Second, there is no means of comparing the valuations of different individuals or the valuations of the same individuals at different instants other than by establishing whether or not they arrange the alternatives in question in the same order of preference"(Mises 1966, p.354).

Murray Rothbard argued that indifference "*cannot be a basis for action.* If a man were really indifferent between two alternatives, he could not make any choice them, and therefore the choice could not be demonstrated in action. . . There is. . . no role for the concept of indifference in economics or in any other praxeological science"(Rothbard 1970, p.265).

[13]The Austrian would remark however that the points of choice are different! And there is anyway a difference between drinking *this* juice first and *that* juice afterwards.

[14]We have no means to see the coin or any other device for the generation of a random sequence. This is the reason for using the quotes.

[15]We also get a reconstruction of the Austrian idea that all this is going on 'outside of time'.

is a whole graphic language developed with their help. But, in Austrian economics, there is a general skeptical attitude toward such a language.[16] This attitude is connected with Austrian views on the use of mathematics in economics, but we will analyze it later.

Let us go now back to the Austrian version of value theory. Summing up what we have already pointed out, action is sorting opportunities. This sorting is a valuation process through which units of a good receive their respective value.[17]

According to the Austrian view on value, if we rank units of a good, then we are bound – using our terminology – to place them on a stack.[18] A unit sits on top or near the top, others are placed at lower levels. At the limit, the unit that has the least utility is bound to have the worst ranking.[19] Actually the unit that the individual would prefer to lose is the first to be placed on the stack.[20] Thus, if you think about the structure of a stack, then you realize that this is the unit that has the lowest ranking. All the other units are placed at superior levels.[21]

This is a way of presenting a famous law of marginal utility - the law of diminishing marginal utility.[22] But this is only a very simplified version.

[16]Rothbard uses however tables and a graphical language. See(Rothbard 1970, *passim*).

[17]It is important to note that different units of the same good might receive quite different ranks in the stack at the same choice point. In order to illustrate this point we may quote an example from Mises: "A man owns five units of commodity *a* and three units of commodity *b*. He attaches to the units of *a* the rank-orders 1, 2, 4, 7, and 8, to the units of *b* the rank-orders 3, 5, and 6. . . (Mises 1966, p.120)".

[18]Rothbard(1970, p.27, 53-4, 72 a.s.o.) uses a representation of value-scales that looks like a stack. Those representations do not seem however to be LIFO (last-in-first-out) structures. The LIFO, push on top, pop out from top, structure is characteristic for stacks.

[19]Mises underlines the fact that there is no connection between this and the structure of our minds. "For the description of these facts economics does not need to employ the terminology of psychology. Neither does it need to resort to psychological reasoning and arguments for proving them"(Mises 1966, p.123).

[20]Mises is also formulating the problem in these terms. He writes about an individual that "must choose between two units of *a* and two units of *b*. . . " and prefers "to lose two units of *a* rather than two units of *b*"(Mises 1966, p.120). The problem, as we can see, is about *losing* a unit of a good. In our terminology, this means to be at a low position on the stack. One always picks items first from the top of the stack. Anything that is at the bottom of the stack is chosen at the end.

[21]It is a bit like sorting the books in your library. I, at least, try to keep on top of various stacks the books that I use often. The books that might be thrown away are put in a store or are simply kept on some remote shelf.

[22]In(Friedman 1990, pp.84-85) the discussion focuses on bundles of oranges consumed by an individual. "If the question is whether to have one orange a week or none, you would much prefer one. If the alternatives are 51 oranges a week or 50, you may still prefer the additional orange, but the gain to you from one more orange is less. The marginal utility

There are problems with transitions from one choice point to another and with fragmentation and unity of action.

Let us examine the relations between choice points in a concrete situation. When I was younger, it was very difficult for me to find papers treating topics from the second part of this book. Now I can find hundreds of papers on those topics. When I was a student, in Bucharest, in the library of the Department of Philosophy it was impossible to find all the Greek classical texts. Now it would be possible to read all those texts in various forms. But I have to keep a list of priorities. To take a more mundane example, suppose that my wife buys potatoes. Then my mother-in-law brings in more potatoes. More and more potatoes pile up. If I keep them on a stack, I rebuild the stack each time and this is the idea!

Let us formulate the idea that came to our minds in a more abstract way. If it is possible to reconstruct the stack of choices, after the transition to a new choice point, then the new problem is reduced to the old one that we already know how to analyze. If more units of the same item are coming in, then the stack is disassembled and reconstructed. We may imagine that we use something that resembles the stacks in the Hanoi towers problem or that we store the items in different transshipment centers and then rebuild the stack. The new units from the same kind of item are placed at the bottom.[23] The more useful units get a place near the top of the stack.

This was one type of transition relation. It was possible to reconstruct the stack of choices. But this is not always the case. Suppose that an archaeologist is assembling pieces of an old object. Then some lost fragment, not necessarily the last, may be the key that enables the archaeologist to find out what was the object as a whole. Fragments like these cannot be placed on the stack, as we would do with units from some homogeneous good. Finding one more fragment might be uninteresting. Other fragments might lead to the whole object. Then the object must be evaluated as a whole.[24]

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of an orange to you depends not only on the orange and you, but also on how many oranges you are consuming. We would expect the utility to you of a bundle of oranges to increase more and more slowly with each additional orange. Total utility increasing more and more slowly means marginal utility decreasing, . . . , so marginal utility decreases as the quantity of oranges increases"(Friedman 1990, p.84).

[23]Think that my father brings more potatoes in! This is the clearest example of something that we might never use. I have no adequate storage capabilities or our family rarely eats potatoes and so on. It is easy to apply in this case the "what you prefer to lose" analysis.

[24]Mises has an example that fits nicely into this discussion about fragments and wholes: "The owner of 100 logs may build a cabin which protects him against rain better than a raincoat. But if fewer than 100 logs are available, he can only use them for a berth that

The idea of fragmentation versus whole is very powerful. We will use it in order to reconstruct a fundamental feature of the Austrian approach to economics. Austrians insist on the relationship between means and ends. In this part of our reconstruction we bracket however the idea of end. However, we may cover the very notion of means under the umbrella of fragmentation. There are actions that are only parts of a larger complex of actions. We value them only as parts of an intricate action. Formally, the difference lies in the properties of the transition relations among choice points. The idea is quite simple: sometimes we just chose in order to get to another choice point and so on until we reach a point at which we can take advantage of the whole complex of actions.[25]

3.2 The Price of an Action

Until this moment we have considered only choice points and relations among choice points. There were no interactions among individuals. In order to reconstruct the idea of price,[26] we will interactions. There are at least two individuals x and y. The individual y is able to perform an action. He is able, for example, to bring a glass with apple juice and give it to x. But x has to do something in order to receive the glass with juice.[27]

Prices are social phenomena.[28] The individual x has to pay a price in

protects him against the dampness of the soil. As the owner of 95 logs he would be prepared to forsake the raincoat in order to get 5 logs more. As the owner of 10 logs he would not abandon the raincoat even for 10 logs"(Mises 1966, p.125).

[25]Our reconstruction extract, so to speak, the pure combinatorial content of an analysis like this one from Mises: "...a quantity a of cause brings about – either once and for all or piecemeal over a definite period of time – a quantity α of effect. With regard to the goods of the higher orders (producers' goods) it means: a quantity b of cause brings about a quantity β of effect, provided the complementary cause c contributes the quantity γ of effect; only the concerted effects β and γ bring about the quantity p of the good of the first order **D**. There are in this case three quantities: b and c of the two complementary goods **B** and **C**, and p of the product **D**(Mises 1966, p.127). We stress the idea that behind each complementary good there is an action. Thus the actions too are bound to be complementary.

[26]David Friedman has a compact formula for the concept of price. "Price is what you *have* to give up in order to get something. Value is what you *are just barely willing* to give up to get something"(Friedman 1990, p.50).

[27]"The societal formula is: *do ut des*"(Mises 1966, p.194).

[28]Mises stresses this idea of the price as a social phenomenon. He writes that prices "are social phenomena as they are brought about by the interplay of the valuations of all individuals participating in the operation of the market. Each individual, in buying or not buying and in selling or not selling, contributes his share to the formation of the market prices. But the larger the market is, the smaller is the weight of each individual's

order to induce the individual *y* to perform an desirable action, from her point of view.

Why interact with others? The explanation is quite simple, but many times we may overlook its nature. Again, examples are the best way to illustrate the idea. Let's say that I want to cut my hair. I do not know how to this. It might look terrible if I do this myself. There is someone who has mastered the art of cutting the hair of other persons. It makes a lot of sense to interact with that individual and induce her to cut my hair.

How to induce others to cut my hair in a beautiful way? [29] They might do this as a gift or as a charitable act. Maybe someone cares for me. The general principle is however to pay. This means simply that I have to do something for the other individual.

This idea of payment is very general indeed. Even if the other person

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contribution. Thus the structure of market prices appears to the individual as a datum to which he must adjust his own conduct"(Mises 1966, p.331).

[29] Adam Smith formulated a principle of cooperation within the framework of the division of labor:

> Whoever offers to another a bargain of any kind, proposes to do this. Give me that which I want, and you shall have this which you want, is the meaning of every such offer; and it is in this manner that we obtain from one another the far greater part of those good offices which we stand in need of. It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages.(Smith 1981, p.26-27)

Incidentally, we find this association between 'the butcher, the brewer, and the baker' again in the following context:

> The butcher, the brewer, and the baker soon join them, together with many other artificers and retailers, necessary or useful for supplying their occasional wants, and who contribute still further to augment the town. The inhabitants of the town and those of the country are mutually the servants of one another. The town is a continual fair or market, to which the inhabitants of the country resort in order to exchange their rude for manufactured produce.(Smith 1981, p.378)

The three are part of a vast cooperation network. As it is usually pointed out, the principle of cooperation is the basis for the institution of the division of labor. Without the division of labor, to quote again Adam Smith:

> In the lone houses and very small villages which are scattered about in so desert a country as the Highlands of Scotland, every farmer must be butcher, baker and brewer for his own family.(Smith 1981, p.31)

cares for me, I have to reciprocate. At least, I have to continue to be there.[30]

In the second part of the book, an important role in the argument will be played by money. Money, if we think in the terms of the beggar example or an exchange in general, is nothing but a means to reciprocate in any situation. I may be unable to do some specific action for *y*, but she accepts money. She might want to find food for cats. I have no food for cats. But I can give her money. If it is widely accepted, money facilitates any interaction.[31] In the second part, we will see however that money is much more than this. It opens wide windows of opportunity in a universe of possible worlds. Otherwise we are confined to narrow windows of opportunity, probably mainly in the actual world.[32]

3.2.1 Trade and Benefits

How to put formally this idea of inducement? Gains from trade are the formal way of talking about the inducement to interact. The individual *x*, for example, performs the service *a* for the individual *y*. The individual *y* performs the service *b* for *x*. From the perspective of *x* the action *b* is more

[30] Adam Smith is prudent. He says that "a beggar chuses to depend chiefly upon the benevolence of his fellow-citizens"(Smith 1981, p.27). However, if we think in a formal way, begging is a limit case of exchange. On one hand, the beggar reciprocates in his way: he or she may prey to God for me or just say 'thanks' and so on. On the other hand, even if she or he performs no action in exchange, it is still an exchange. The other part accepts and this is all that matters formally. It is also important to note the contrast between this type of relation and the situation in which one side has to give something because it is coerced.

[31] The three characters of the butcher, the brewer and the baker come back again when Adam Smith writes about money:

> But when barter ceases, and money has become the common instrument of commerce, every particular commodity is more frequently exchanged for money than for any other commodity. The butcher seldom carries his beef or his mutton to the baker, or the brewer, in order to exchange them for bread or for beer; but he carries them to the market, where he exchanges them for money, and afterwards exchanges that money for bread and for beer. The quantity of money which he gets for them regulates too the quantity of bread and beer which he can afterwards purchase. It is more natural and obvious to him, therefore, to estimate their value by the quantity of money, the commodity for which he immediately exchanges them, than by that of bread and beer, the commodities for which he can exchange them only by the intervention of another commodity;(Smith 1981, p.49)

[32] We prefer to insist on the *possible* and not on *time*. Time is just a part of the picture of the universe of possible worlds.

valuable than a. From the perspective of y the action a is more valuable than b.[33] Both gain as a result of the interaction.[34]

The Individual as Agent/Patient There is crucial novelty introduced by the idea of interaction. For any action, an individual may play the agent role or the patient role, the role of the individual who is affected by the action.[35]

[33] See the example and a detailed discussion in (Rothbard 1970, pp.72-24).

[34] For a thorough treatment of the idea of gains from exchange see (Rothbard 1970, pp.221 ff.). Note that, for Rothbard, "value scales of each individual are *purely ordinal*, and there is no way whatever of measuring the distance between the rankings"(Rothbard 1970, p.222). One can contrast Rothbard's view with the mainstream idea of consumer surplus. David Friedman, on the other hand, approaches consumer surplus from the perspective of paradoxes. A decade ago, in an informal conversation, he told me explicitly that no theory deserves our attention if it does not generate paradoxes. This is a normal attitude is we look at science as a problem-solving activity. In (Friedman 1990, p.92), he starts with the classical diamond-water problem. The total value of water to an individual is (probably!) greater that the total value of diamonds. Probably no one wants to die on mountain of diamonds because she has no water. The solution of the problem lies in the examination of *marginal value*. Marginal value of water is much less than marginal value of diamonds. David Friedman goes on and states that "this brings us to another (and related) paradox"(1990, p.92). I would be as happy without any trade. There is nothing to be gained from trade since I am paying for the value of what I get. Again marginal value is the solution. David Friedman's example is with wine, but I will adapt it a bit and speak about juice. Up to this point there was (almost) no difference with the Austrian approach. But now starts the difference. The first glass of juice that I get has, let's say, a value to me of \$10, but I buy it with \$1. Then you get another glass of juice at \$1, but this time its value for you is \$9 and so on. In terms of wine, "your consumer surplus from buying wine at some price is the value to you of being able to buy as much wine as you wish at that price — the difference between what you pay for the wine and what it is worth to you"(Friedman 1990, p.94). The difference of approach is most instructive. The Austrian might accept a conceptual difference between average value and marginal value. But it does make no sense for him to sum up somehow the surplus of marginal value. Marginal value is an incentive to action. Money also, I think, comes in at a later stage in the Austrian perspective. We will discuss their role and the role of monetary prices in the second part of the book.

[35] The intention of this distinction between agent and patient is to create the ground for a an evaluation of the role of violent, aggressive actions. We have at our disposal a number of strategies. We might follow a neoclassical approach and show that violence is a source of inefficiency at the level of the society. The problem is first that, for the moment, we have not defined the concept of efficiency and, second, as we shall see later, the very notion of efficiency at the level of a society is doubtful. The second strategy is to adopt an axiom of non-aggression as Rothbard does. Rothbard states that "no man or group of men may aggress against the person or property of anyone else"(Rothbard 1978, p.23). Rothbard defines aggression as violent invasion. Then you have to define the idea of invasion itself and you end up with self-ownership. We will come back at this later.

We have now to reinterpret the model of a space of choice-points, used in the discussion about value. Individuals choose as agents and as patients[36] of actions from a set of actions. An individual as patient may desire or not desire to be affected by the action of the other individuals. Again we may use the stack in order to represent choice at a given point.

A consumer is an individual who both chooses as patient and as agent. As agent, however, performs only the action of consuming.

Consuming is a sign that the individual benefits from the action of another individual.[37] The presupposition here is however that an individual

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For the moment, let us remark only that it is at least difficult, in this moment, to translate all this in the language of a formal theory of action.

We try another strategy. We have taken into our model an element that has its origins in grammatical theory. From this it migrated into computer models of natural language. Terry Winograd wrote that "the majority of verbs in English have case frames for material process clauses. In most case analyzes, pairs such as AGENT/PATIENT or ACTOR/AFFECTED characterize the two major participants"(Winograd 1983, p.498). Explaining what is a PATIENT requires further distinctions. Basically, as did Chafe, it seems appropriate to use PATIENT for an object something happens to, while COMPLEMENT refers to an object that is really affected by the action – cf. Winograd(1983, p.319). Now comes in the obvious problem. Which are for identifying the PATIENT? There are two types of criteria, according to Winograd: syntactic and semantic. From our point of view, the syntactic criteria would be most interesting. For the linguist, these criteria are connected with rules of transformation of sentences. Let us examine two sentences from (Winograd 1983, p.319):

- *The wind* opened the door.
- *The key* opened the door.

Is 'the wind' from the first sentence an actor? Why 'the key' is an instrument? From a formal point of view what matters are the following results of transformations into passive sentences:

- The door was opened by the wind.
- The door was opened with the key.

Now, 'by' is connected with or is the formal sign of an agent, while 'with' shows that the rule relates, in this situation, 'the key' to an instrument.

There are some obvious problems with such an approach from our point of view. The syntactic criteria are correlated with a language. We have to find something correlated with actions. The other problem is less troubling but we should mention it. In the theory of action agents or patients are only the individuals.

[36] A terminological remark: 'agents' are also called 'actors' and 'patients' are called sometimes 'undergoers'.

[37] Also from linguistics comes the idea that one should distinguish between:

- Tom looked at Joan.
- Tom gave Joan a glass of juice.

as patient is absolutely able to avoid consuming in the case of undesired actions.

In a system of interactions, individuals are also patients of undesired actions.[38] These actions are not beneficial. They are disadvantageous.

For interactions we need a more complex formal model than the space of choices. This model will be discussed in the second part of the book. For the moment we stick to the simple idea of a space of choice-points. It enables us to discuss such fundamental concepts as value, price, cost and efficiency.

3.2.2 Needs Are Useless

What would happen, from a philosophical point of view, if we do not adopt the point of view of gains from trade, but the idea that trade must be an exchange of equal values? First, there is - as we already saw - a problem of finding out what is equal with what. Let's say that we accept that these values are given by the equal amount of socially necessary labor incorporated in a good.[39] Why then engage in trade? If one adopts this way of thinking, then she has to bring in the idea of "need".

In this version of the explanation of the incentive to trade, the two sides have different needs. The actions of the two sides satisfy different needs. They have equal value, but satisfy different needs.

Despite the fact that we use the notion of need in everyday language, something is wrong with it.[40] First, if there are needs, then why use also a

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In the first case Joan is the patient. In the second sentence, Joan is the patient and the beneficiary (probably!) of Tom's action.

[38] Think about the following sentence

- Tom kissed Mary.

The sentence is ambiguous. We have to look for actions in order to understand what happened. Was Marry happy? Maybe Tom was forced to kiss Mary! Did they agree? We follow here the strategy according to which actions play a key role in our understanding of such sentences. If the sentence is part of a story, then we look clues in descriptions, presuppositions and so on.

[39] Old-fashioned Marxism used to cultivate this idea. In the former communist countries it remains an important ingredient of the mentality of a lot of people.

[40] Mises uses the word "need" in *Human Action*, but only in order to explain that "There is no room left in the field of economics for a scale of needs different from the scale of values as reflected in man's actual behavior"(Mises 1966, p.96). He also points out that "it is arbitrary to consider only the satisfaction of the body's physiological needs as 'natural' and therefore 'rational' and everything else as 'artificial'...(Mises 1966, p.20). From this perspective, human needs are human desires as demonstrated by the individual's choices.

concept of choice? The choice would be only among means of satisfying needs. But it should exist a best way of satisfying a need.

Second, needs would wipe out the very foundation of action as speculation of possibilities. Needs would provide solid ground for action.[41]

Needs are useless in a model based on the idea of a space of choice points. Thus there is no reason to claim that we exchange equivalent values.

3.2.3 To Pay a Price

How we know that someone benefits from the action of another individual? Willing to pay a price for it is a sign that the individual find the action of the other beneficial.

This view keeps the model simple, but leaves us with a formidable problem. Somebody might pay because was forced to pay. The usual solution is to exclude violence and fraud from the world of trade.

A first look at constraints will be possible as we discuss next the concept of cost.[42] Imposing a cost on somebody is a way of constraining.

A second type of usual constraint is the budget constraint. The individual pays within he limits of a given budget. For the moment this kind of constraint is captured only by the idea that individuals are finite beings. They are able to perform a limited set of actions. Thus they have limited capacities to pay.

[41] David Friedman has an excellent argument against the use of the concept of need in the analysis of human actions. "The word needs suggests things that are infinitely valuable. You need a certain amount of food, clothing, medical care, or whatever. How much you need could presumably be determined by the appropriate expert and has nothing to do with what such things cost or what your particular values are... Perhaps our objective should be a society where everybody has enough... [But] 'enough of everything' is ... not a reasonable goal... It is often assumed that if we could only produce somewhat more than we do, we would have everything we want... This argument confuses increasing the value of what you consume with increasing the amount you consume... my desire for quality of food or quality of car would remain even at a much higher income, and my desire for more of something would remain unsatiated as long as I remained alive and conscious under any circumstances I can imagine"(Friedman 1990, pp.23-24).

[42] This *concept of cost* should be distinguished carefully from the cost involved in economic calculations. "In the calculation of the entrepreneur costs are the amount of money required for the procurement of the factors of production. The entrepreneur is intent upon embarking upon those business projects from which he expects the highest surplus of proceeds over costs and upon shunning projects from which he expects a lower amount of profit or even a loss"(Mises 1966, pp.339-340). Money is involved in economic calculations.

3.3 The Cost of an Action

Despite its simplicity, the model of a space with choice points is powerful. At each point there is a choice set for a given individual. These choices are the opportunities of action. As agent or as patient, the individual chooses among these opportunities.

Each such choice has a cost. The individual gives up the performance of the other actions. The well-known name of this concept of cost is "opportunity cost".[43]

Let us now have a closer look at the two ways of turning away from an action at a given point. One may turn away as agent or as patient.

As the agent of the action I may write this text while I listen music, but I have to turn away from a series of actions. I cannot, at the same time, write in my library at home and go to the supermarket.

As the patient of the action, I can listen to music, but I have to pay for the CD, electricity and so on. I may enjoy what is written in a book, but given the budget constraints, I have to give up the acquisition of a new shirt.

At limit, as agent or patient, even if I do not do anything, there is a cost. I turn away from opportunities of action.

The fact that there is a cost for the patient of an action is very important. It is a first way to capture formally the idea of constraint. If someone forces me to do something, then this is a cost.[44]

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[43] It is important to note that "opportunity cost is not a particular kind of cost but rather the correct way of looking at all costs"(Friedman 1990, p.43).

Stigler(1987, pp.112-113) explains why one has to look in this way at costs. The reason is that historical costs have no relevance for actual price. "I buy a rock for $10, and it proves to be a diamond of remarkable purity – will I sell it for $10?"(Stigler 1987, pp.112-113). One may imagine a lot of historical costs that are irrelevant. The concept of cost must be different: "the cost of any productive service in producing A is the maximum amount it could produce elsewhere. The foregone alternative is the cost"(Stigler 1987, p.113).

One should note also why it is so important this concept of cost for individual action. Again an example from Stigler(1987, p.115-116) is very suggestive. Stigler mentions that during substantial inflation in France the rents were frozen. Even if we suppose that a landlord did not pay for electricity, cleaning etc. (i.e. had not additional historical costs), the cost as opportunity cost did raise. Over a long period of time the supply of houses did shrink, because landlords and potential landlords sought more profitable fields of investment.

The example illustrates also the idea that human action is speculation. The action of the government had an influence not only on actual landlords, but on possible landlords who sought to speculate better opportunities.

[44] We have to note that we must adopt here the perspective of a universe of possibilities.

3.3.1 The Subjectivity of Costs

Let us suppose for a moment that the individual is under no constraint. Anything that an individual does, at a certain moment, is bringing to him a benefit. By definition, the actions that are not performed are less valuable.

One may attempt to sum the value of the forgone actions and ask, speculatively, if this sum is not greater that the action actually performed. It is impossible however to sum up. If the individual executes another action than the one at the top this precludes the performance of any other action and so on. And any other action than the one at the top is less valuable. Therefore it brings fewer benefits. But it makes no sense to ask what is the value of the sum of actions. They cannot be performed together by definition.

Of course, all the forgone opportunities are part of the cost.[45] There is no meaning in summing them up, but we can take as a formal guide the best action that has been given up. Sometimes, external constraints force the individual to reveal which is the next best action.

Let us say that the constraint precludes the execution of the action on top. If the constraint rules out the possibility of performing the action that is on top, then the cost is maximal at the respective point and the individual has to reveal her next option.

On the other hand, the actions that are ruled out might have a low position in the stack at a given point. I do not smoke and I rarely drink. A rule that would constraint me not to smoke or drink would impose a very low cost to me. The cost depends strictly on the point of choice.

Sometimes, a less formal approach is adopted and one talks about the subjective nature of costs. This subjectivity is significant however in important debates as, for example, the debate concerning planning.[46]

When x forces y to do something there are forgone opportunities for y that were better than the action she was forced to perform, namely the actions she would have performed in the absence of constraint. But in order to make sense of the 'would have' we need to think in the terms of a universe of possibilities.

[45] David Friedman notes that "the cost of living in a house that you already own is not, as you might think, limited to expenditures on taxes, maintenance, and the like; it also includes the interest you could collect on the money you would have if you sold the house to someone else instead of living in it yourself"(Friedman 1990, p.42-43).

[46] Karen Vaughn noted that Hayek underlined the importance of the subjectivity of costs in the planning debate.

"In fact," – writes Vaughn – "the costs incurred in the production of anything equal the value of the foregone alternatives. But at the time a production decision is made, the values of the foregone alternatives depend upon the decision-maker's expectations about future prices, which are necessarily largely subjective"- Karen Vaughn "Introduction" to (Hoff 1949, p.xxi). Planners are in the same situation as any decision-maker.

3.4 Going into Different Directions

We are now between two sources of reasons for divorce among different views on human action. We will describe them briefly. The first reason for parting is connected with the distinction between agents and patients. The second difficulty leads us directly to what might be the main source of disagreement in the theory of action: the problem of efficiency.

3.4.1 Victims and Injurers

It seems natural to think that an injurer is an agent who harms a victim. Injurers seem to be a subset of the set of agents and victims a subset of the set of patients. It is far from being that simple.

First, as the reader may have already thought, the distinction agent-patient might seem too fragile to stand up during a discussion that is so complex and difficult as the discussion about victims and injurers.[47] The solution that this group suggests is to look for very well-defined rules that distinguish between the spheres of action of the individuals.[48] Private property is the key for this conception.[49]

Vaughn also notes that James Buchanan argued that the whole planning debate hinged on the question of the subjectivity of costs. She thinks that this is however an affirmation that is too broad.

[47] In researches that are bound to be systematic, formal and to lead to operational results, such as the researches in artificial intelligence, doubts concerning the viability of the distinction between agents and patients have been expressed quite long ago. In an introduction to artificial intelligence that is paying a lot of attention to philosophical problems the distinction between agents and patients is treated as an interesting, but caught up in a maze of rather uncertain distinctions:"...case grammar is nevertheless a controversial theory. Probably the major problem is the inability of people to, in fact, come up with a small set of cases that will work for all verbs"(Charniak and McDermott 1985, p.233). One might say that this is precisely what happens in a general theory of action. The correlated distinctions are not at all that definite.

[48] Walter Block formulated quite well this view in his criticism of Coase and Demsetz. He states that "according to traditional morality, each person is a self-owner.... All they own is what they produce. More exactly, all they own are the *physical goods* that they produce. They cannot own the *value* of what they produce, because the value of a good is determined by other producers and consumers..."(Block 1977, pp.112, 113). Thus we start on the firm ground of self-ownership and then extend the sphere of the individual.

[49] Private property offers a clear criterion for the sphere of action of the individual and, more than this, it is fully consonant with morality. "It is evil and vicious to violate our most cherished and precious property rights in an ill-conceived attempt to maximize the monetary value of production. As the merest study of praxeological axioms will show, it is

On the other side, there is the idea that the distinction between victim and injurer is not that well established. The injurer might quite well be the patient of the action of the victim. From this point of view, they both contribute to the final result.[50]

David Friedman offered a simple example of a situation that illustrates the seemingly paradoxical idea.[51] In the imaginary situation there are two adjoining tracts of land. On one tract of land there is a not especially noisy factory. For years there are no complaints. The other tract of land is sold and the new owner builds a recording studio next to the noisy factory. He demands that the factory shut down, because it is too noisy for a recording studio.

The owner of the factory did literally nothing or, at least, he continued to do what he has done for years. The victim initiates the action that leads to a case of pollution. In this example we see clearly that very different presuppositions underlie different views of action. If one thinks that private-property rights are rigid, then she will ask for their enforcement. The other side will just remark that property rights might not be very clearly defined in this case. Thus there is need for an action of the judges.[52]

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also *impossible* for an outside observer (the judge) to maximize the psychic value of production"(Block 1977, p.115). Thus judges have to defend the protected sphere of action of the individual and nothing else. As one would expect, people who do not hold this view would claim that their "conclusions were an exercise in positive economics"(Demsetz 1997, p.103). Block (2000, p.64) still insists on the primordiality of property rights, but accepts that this is a normative point. He also makes a broader claim in the final part of his paper:"If there is one thing that describes private-property rights is the word 'rigid.' That is, in any disagreement over land or other possessions, they are to be awarded to their owners"(Block 2000, p.73).

[50]In the case of pollution, David Friedman writes that "an external cost is not simply a cost produced by the polluter and born by the victim. In almost all cases, the cost is a result of decisions by both parties"(Friedman 1992, p.56).

[51]In (Friedman 1992, p.56-57).

[52]There are variations on this topic, because some authors might prefer the action of regulators not the decisions of the judges. Britt Groosman notes that Michael C.M. Leung in 1992, for example, "suggested a pollution tax scheme which would tax both the injurer and the victim. Assume a situation where the polluter and victim have full information about each other's taste and technology, but the regulator is faced with a lack of information. The question is then how to reach an (economically) efficient pollution level. This scheme should help the uninformed regulator in case of a sequential game and would lead to a first-best output. The polluter is taxed to redistribute revenues amongst polluter and victim, whilst the victim is taxed to avoid exaggeration of the damage claims by the latter"(Bouckaert and Geest 2000, vol.2: 554). Here the crucial question that is raised is the lack of knowledge, a problem at which we will come back later.

3.4.2 Efficiency: Travels in Different Directions

Let us focus again on David Friedman's example. In his analysis he brings in a very important notion: the lowest cost avoider[53]. The idea is that the owner of the noisy factory is not the lowest cost avoider of the pollution effect.

In order to reach the conclusion we have obviously to compare the costs of the two individuals involved. But we work in the context of the choice point model. For the moment we have no technique for comparing the choices of different individuals.

Now comes in the major source of splitting: efficiency. We adopt the following strategy for the reconstruction of different approaches: efficiency of just one action at the level of a given choice point is trivial. The real problem is composition of actions. Complex actions might be inefficient. But how? When it comes to complex actions it is possible to arrive at the same point (or state of affairs, if you like) through different actions. Now, even the same individual has a problem. How to compare the ways?

Before we go on with the analysis of the problem in the context of the choice point model,let us examine a very well-known problem. Suppose that you are a *traveling salesman.* You have to visit a number of *n* towns. How can you visit them all only once, come back to the starting-point and minimize the travel distance?

The problem is far from having just a theoretical flavor. It is a problem, for example, for people who are programming the arm of a soldering robot. The robot has to solder a number of points only once and come back at the initial position, ready to repeat the process, and minimize the length of the route along which it is moving.[54] What they want to find is an *efficient* way of moving the arm of the robot.

The technical problem described above is far from being as complex as a human problem. In the case of the technical problem the distance was minimized. Minimizing subjective costs is however another problem. They change from one choice point to the other. That is why we are at a crossroad.

We have used already the concept of transition relation. It is crucial now to think now not only about the transition from one point to another point, but about what is rigid from one point to another and how one sees

[53] See Friedman (1992, p.56).

[54] For an analysis of the problem formulated in this way see the lectures on algorithms by Steven Skiena at <http://www.cs.sunysb.edu/~algorith/lectures-good/ps/all.ps>; we will come back later at the problem of designing an algorithm that solves this problem.

other points of choice from the perspective of a given point.. As we saw above, there is a suggestion that private-property relations are rigid. From another point of view, this does not work. We have to adapt our ways of delimiting private property.[55]

3.4.3 Kinds of Approaches to Individual Plans

Let us look again at the idea of a complex action. Let us suppose that is a genuine complex action. Its components are actions that an individual chooses to perform at *different* choice points. Thus each such action has a cost. This is an opportunity cost: it is made up of forgone opportunities.

We may introduce now a notion that is crucial for the argument of this book: the plan. The plan is the course of a complex action. It has to start with a unique action. Then, for a given action, at a certain point, it has to specify the next action or the conditions for a step further and how are going to be treated the alternatives, in such a way that there is a unique successor action for any action, except for the final action. There has to be a final action and the number of actions in the complex action must be finite.

If an individual considers the costs of different plans for complex actions, even in the case of complex actions that lead to the same final result, there are differences of cost. This is the problem of efficiency. It makes a lot of sense for anyone to minimize the lost opportunities.

Why would we make plans? This might seem a curious question, but it is a good question. Why not lump together somehow all the actions and just choose? After all, we are just carving a place in a universe of possibilities. There is a first answer to this question. Let us think that our salesman wants to find *the correct* answer to his problem. He computes all the $n!$ permutations of the routes between n towns and chooses the shortest path. Obviously, it is easy to do this for 3 towns: there are only 6 permutations. But the number of permutations increases rapidly.[56] Our poor salesman can find in this way a correct solution to his problem, but finding it leads to an extremely inefficient action, because the whole process will take lot of time when n is greater than 10 or 20[57]

[55] The law and economics approach is emblematic from this point of view.

[56] $n! = 3628800$ and the value of 100! is a number with 158 digits (for details on factorials see any good book about mathematical ideas; for example, Charles D. Miller, Vern E. Heeren, E.John Hornsby, Jr. *Mathematical Ideas* (HarperCollins*Publishers*, 1990), p.510). Try to write a program for computing factorials in your favorite computer language and you will see immediately how tricky is this task when $n > 150$.

[57] See the site of Steven Skiena at <http://www.cs.sunysb.edu/

If we move toward a genuine problem of choice, we may suppose that the salesman has a girlfriend in each town. Distances play in the new version of the problem no role. He wants to choose the nicest possible journey from one girlfriend to the other. The problem is not to visit first the *nicest* girl and so on! The problem is to find among all those permutations of the visits the one he would like most. It is clear that there must be a trade-off between the complexity of the choice itself and planning complex actions.

Each action that is integrated in a complex action of an individual takes place however at different points in the universe of possible actions of the individual. How can the individual make sense, from the perspective of the starting-action, of all the other actions that are part of the plan? What sense makes the idea of opportunity cost in this context?

The Romanian logician Adrian Miroiu proposed a very interesting kind of approach to sentences and possible worlds that we will try to adapt to the present context. He is interested in sentences like this: "In world w', that Quine is a distinguished philosopher is the case in world w". He calls such a sentence a world-indexed sentence.[58]

Miroiu uses the standard metaphor in modal logic and calls 'worlds' what we call 'points'. The worlds have a rich structure and are able to reflect other worlds. It is also possible that in the world w the world w' reflects the world w''.[59] This is precisely the kind of relation that we need for a model of individual planning. At a certain point w we need a reflection of the structures at another points.

The idea inspired by Miroiu's technique is to consider, for a given individual, the point-indexed plans he has at a given point. Point-indexing works like this: at point w_k it is true that the individual i chooses at point w_{k+j} to perform action a as part of her plan a. Point-indexing plans makes possible for each action that is part of the complex action to have a cost indexed to the point at which the action starts.

Now that we have the abstract framework of the point-indexed plans we can reexamine the possible views on individual plans at a given point in the universe of possibilities for action. However one should not forget that our strategy is minimalist: we try to keep our analytical tools at minimal level and not to inflate our concepts

One attitude toward plans is to stress that they are the plans of individ-

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`~algorith/lectures-good/ps/all.ps`> Skiena explains why it is impossible to find a solution that is both correct and efficient.

[58] For some of the technical developments of the idea in modal logic see Miroiu (1998).

[59] For details see Miroiu (1997, p.29).

uals and that they have a strong speculative character. This might be called the *Austrian* position, since the Austrian school is the least inclined to admit any rigidity at this level. Its members stress indeed the relevance of private-property relations, but at this level of the model there is yet no specific representation of any kind of constraint upon the interactions among individuals. There is however a rigidity! An individual is the same individual from one choice-point to another. We will see immediately that this is a significant restriction.

The other important attitude is to assume that a layer of choices is stable from one point to another. In the usual language of mainstream economics this means *stability of preferences*[60]. Stability of preferences is a key assumption in the rational-choice model of human action. It helps to make sense of predictions.[61] On the other hand, the rational-choice model of action is much richer than the choice-point model. It combines the assumptions of stable preferences with maximizing behavior and market equilibrium. We will reconstruct, however, the market in a different model. Anyway, stability and maximizing behavior are already the ground for splitting between different approaches to human action.

It is also interesting to pay attention to another assumption that is almost ignored in the economic literature. This is an assumption about something that philosophers call *personal identity*. How we can talk from one choice-point to another about *the same* individual? Which are the criteria for identity? The philosopher Derek Parfit, for example, has developed an intricate argument that leads to the conclusion that nothing identifies individuals in a strict manner. The very identity of the individuals is fuzzy, rather than clear-cut. Parfit's corollary is that any focus on maximizing behavior and personal-interest is misplaced since there not clearly identifiable *person*.[62]

We will devise (in the second part of the book) a way out of the maze in which arguments like that of Parfit are engaging us. Our strategy will be

[60]"The preferences that are assumed to be stable do not refer to market goods and services, like oranges, automobiles, or medical care, but to underlying objects of choice that are produced by each household using market goods and services, their own time, and other inputs"(Becker 1976, p.5).

[61]"The assumption of stable preferences provides a stable foundation for generating predictions about the responses to various changes, and prevents the analyst from succumbing to the temptation of simply postulating the required shift in preferences to 'explain' all apparent contradictions to his predictions"(Becker 1976, p.5). One should also note the subtle contrast between the aprioristic and the empiricist versions of the models of action that is now apparent.

[62]See Derek Parfit, "Personal identity" in Jonathan Glover(ed.) *The Philosophy of Mind* (Oxford University Press, 1976), pp. 161–162 for the corollary of his argument.

to reconstruct in an indirect way individualist arguments for liberty.

Going further, collective entities are an obvious target for arguments that are focused on identity criteria. But from our point of view the most important subject is computation of a social cost and efficiency at a social level.

This is the second point of splitting. It is a major crossroad. Mainstream economics offers examples with all kinds of computations of efficiency. The Austrian school especially is much more restrictive.

3.5 Efficiency

It is easy to define the concept of efficiency in the model with a space of choice points, but it is far less easy to exploit it.

The definition cannot be something else than a formula of the kind "greater benefits than costs". We already have a formal conception about cost as opportunity cost.

3.5.1 Benefits for a Given Individual

If benefit means simply value of an action at a given point, then the action is efficient if the individual is free to act as she chooses. Freedom of action itself means nothing else than that the action at the top is performed. Thus, from a formal point of view, it is a tautology to say, in this case, that benefits are greater than costs.[63]

[63]This "tautology view" is quite different from the assumptions of the mainstream approach in economics. David Friedman who works with the standard tools of mainstream economics formulates very aptly the idea that lies at the bottom of the mainstream approach: "*Economics is that way of understanding behavior that starts from the assumption that people have objectives and tend to choose the correct way to achieve them.* The second half of the assumption, that people tend to find the correct way to achieve their objectives, is called *rationality*"(Friedman 1990, p.2). David Friedman goes on and explains why individuals tend to find the right means for their objectives. He argues that "with no idea at all about what people's objectives are, it is impossible to make any prediction about what people will do. Any behavior, however peculiar, can be explained by assuming that the behavior itself was the person's objective"(Friedman 1990, p.3). However, in order to make such a claim, we have to make some assumptions concerning the transitions from one choice points to another. Again, David Friedman explains quite aptly how this goes in the mainstream approach. He explains that he prefers "to say that... two items are identical enough for our purposes..."(Friedman 1990, p.3). From one choice point to another there are identical opportunities. But he also adds later some illuminating comments on the role of demonstrated preference. For a summary of the whole approach

Of course, the connection between liberty and efficiency is important. We are going to discuss it in detail in the second part of the book.

3.5.2 Goods and Bads

The first problem is that we have to separate carefully the set of opportunities for the individual as agent from the set of opportunities for the individual as patient of an action. For me as an agent, cutting my hair is not part of the choice set. I have no idea how to cut my hair in an acceptable way.

There are many hairstyles. I might like some of them and dislike others. They are going to be put on stack, at a certain choice point. There are also all kinds of other actions that one might be the patient of. Somebody can pour water on your head from a balcony. Another person is able to paint your car. I might be the patient of all these actions.

For an individual x and a point p, we may associate, when the individual is the patient of actions, two types of correlated actions. One is the action of accepting; the other is rejection or avoidance. Each level of the stack of actions has a correlated action of acceptance or rejection. I would try to avoid, for example, the water falling from the balcony when I am going to lecture.[64] Anyway, at a certain level of the stack, the associated actions are avoidances and only avoidances. At all the levels above that level we find only acceptance.

Advantages and benefits are only at the levels that have a correlated action of acceptance. The levels with actions that the individual as patient avoids are the levels of disadvantageous actions.[65]

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see the summary of the first part of *Price Theory* in(Friedman 1990, pp.194-198). The approach adopted here, in the construction of the choice points model, is based on the idea of simple actions from which more complex actions are built according to individual plans. Efficiency is a problem for the plans of action, not for the basic actions. At the level of basic actions efficiency is trivial.

[64]Specifically, the plan for my complex action includes something like this: if they pour water from the balcony, then go on the other sidewalk, else keep going on the shortest path. I might also include in the plan a conditional that is built around a comparison of the costs of bribing the guys who pour water versus the costs of going to the other sidewalk.

[65]Economists have an asymmetric use of terms like 'utility' and 'disutility', 'advantage' and 'disadvantage', 'goods' and 'bads'. In *Human Action* Mises uses 'disutility' 66 times, but 52 times is in the company of 'labor'. Alfred Marshall, in *Principles of Economics*, uses the term 'disutility' 6 times; and there are 5 collocations with 'labor' - all of them in the main body of the book. The WordNet dictionary does not even know the term 'disutility'. We try to have a more balanced approach. People would pay in order to consume less noise and this proves that noise has disutility for them. We stick however

The very nature of the avoidance actions makes them sources of "bads". We may introduce here the economist's distinction between goods and bads. Goods are bundles of actions that an individual accepts.[66] Bads are bundles of actions that an individual avoids.

Violence and fraud are typical actions of the others that one tries to avoid.[67] Taking into account the crucial importance of violence and fraud, it is essential to put these concepts under some general concept of the formal theory of action.[68]

Indirectly, avoidance actions do impose upon us a cost. For example, let us suppose that the shortest way to go my destination is to walk under the balcony from which somebody pours water. Anything I do entails some additional cost. Either I have to dry my clothes, or I have to pay, or to take a longer route. If I take a longer route, I give up the action that is on top of my preferences and so on.

Summing up, goods and bads are connected with the interactions with others. Individuals like some of the actions of other individuals and dislike other actions. Sometimes, avoiding the actions that we dislike might be no problem. But interactions force a cost in other cases.

3.5.3 The Efficiency of Cooperation

An individual can perform some actions independently. The individual x cuts the hair of her cat; y mows the grass; z pours water from the balcony. All these actions can be performed independently.

On the other hand, if x knows how to build every part of a car, except the engine, and y builds the engine, then they are able to build a car only if they combine their actions. They cannot act independently. Compatibility of their individual plans for complex actions is crucial for their actions.

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to the choice-point model. There is no content-oriented characterization of 'noise'. What is noise for somebody is music for another person - at the same choice-point - and has utility, not disutility.

[66] The action of consuming them and wanting to consume more is the mark of acceptance.

[67] Rothbard (1970, p.67) stresses the idea that violence is a type of interpersonal action. A similar action is threat or intimidation. But he has a content-oriented characterization of violence. However, it is very important that through *compulsory exchange* only one side gains. The other side loses (see Rothbard 1970, p.71).

[68] One should note the contrast between the formal and the content-oriented approach here. For example, we cannot use the concept of fraud focusing on some supposed content of fraud actions. Somebody might like the idea of being deceived by a certain person. What is crucial is avoidance, not deception. Violence or deception are not defined formally, but they are content-oriented concepts.

From an economic point of view, coordination in the above case can be reduced to exchanges. For example, who has the engine may buy the rest of the car or vice versa.

On the other hand, economists tend to make a distinction between goods used in production and goods that are only for consumption. We would prefer a distinction between integral and fragmentary actions. Fragmentary actions are dependent actions that have to be combined with other actions in order to obtain a dependent or independent action.[69]

Take for example an intellectual debate. It is possible to pay each participant at the discussion, but it is not possible to buy each intervention as a piece and assemble all the rest. It is possible to do this in the case of papers, but not in the case of interventions in the debate. The contract also cannot stipulate that you will ask ten questions, make three critical remarks and two longer interventions. The debate has to be fluid and spontaneous. It is the result of many fragmentary contributions.

Fragmentary actions are complementary. Each participant at the action of cooperation must integrate in her own stack the fragmentary actions. She must also place the appropriate fragment on top! Without this there is no actual action at the right moment from the point of view of cooperation. Thus cooperation involves a cost.

Now, fragmentary actions raise interesting problems of cooperation. Suppose that someone, when she thinks intensely, also smokes. This is her habit. This is the best way for her. But she must participate in a debate at which smoking is forbidden. Now she calculates what is she going to sacrifice: smoking or the debate. Participating in the debate without smoking is not the best solution for her, but it is still efficient if the cost is less than the benefit (smoking during the debate is less valuable than participation at the debate).

3.5.4 Being in a Better State

The third problem is to characterize the meaning of "being in a better state".[70] Intuitively, the idea is that, from a given point, the individual has access to another point where there are better options. From one point to the other the set of options has been extended in such a way as to offer more valuable possibilities of action. This means that for the individual

[69]Note that 'fragmentary' and 'complex' are not equivalent technical terms. Some fragmentary actions are complex, but there might be simple action that never occurs alone (it is only the fragment of a complex action). Complex actions might not be fragmentary.

[70]For the idea of "improvement" or "better state" see(Friedman 1990, pp.435 ff.).

as agent there are more valuable possibilities of action and for the individual as patient there are new acceptable actions. These actions might be fragmentary or not.

A point is actually better if there is at least one new action that is placed above the action that was before on top. Otherwise there is only a better choice set. There are better possibilities of action.

Now, if we take interactions into account, some better states for the individual *x* might mean a worsening for other individuals. The individual *x* might have, for example, a passion for pouring water from the balcony over the head of other persons, who do not happen to like this treatment.[71]

Vilfredo Pareto proposed a famous way of filtering the betterment, the improvement of the state of an individual. Only those transitions to better choice points are acceptable that do not affect adversely even the state of one individual in the community.[72]

At the level of a community, efficiency is maximal when no individual has access to a better state without worsening the situation of others.[73]

David Friedman contrasts the Pareto approach to efficiency with an approach derived from Alfred Marshall. In the Marshallian approach the idea is to add all the gains and all the losses of the individuals affected by a change. If the difference between total gains and total losses is positive, then this is an improvement.[74] This is the kind of improvement that David Friedman favors.[75] It obviously raises a lot of questions. We will put them under the common umbrella of the problem of "collective efficiency".[76]

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[71]Note that this is simply an imaginary example. We may however imagine an alternative case, in which person has masochistic tendencies. It is only the form that may be discussed a priori. The content cannot be judged a priori.

[72]See Friedman (1990, pp.438-442) for a detailed introduction to the problems of Pareto efficiency.

[73]For an Austrian view on the mainstream concept of efficiency see (Cordato 1980).

[74]See(Friedman 1990, p.441).

[75]David Friedman noted recently that Marshall's solution "is not a very good solution. It is merely, for many although not all purposes, better than any alternative that anyone has come up with since. The result is that economists, in both law schools and economics departments, continue to use Marshall's solution, sometimes concealed behind later and (in my view) less satisfactory explanations and defenses"(Friedman 2000, p.18).

[76]It is also significant to note that Pareto optimality is on the list of critical problems in(Morgenstern 1972). Morgenstern adds to the usual observation that Pareto optimality does not really overcome the problem of interpersonal comparisons of utility the idea that an individual may have knowledge problems when he or she has to assert an improvement. Morgenstern thought that the notion of Pareto optimum must be used with extreme caution.(Morgenstern 1972, p.1170)

3.6 The Problem of Collective Efficiency

In the model with choice points, an individual, at a given point, performs an action. It is possible to characterize such concepts as value, price and cost, but efficiency is more problematic.

We may characterize gains in efficiency, but, even from the point of view of one individual, we have to take into account point-indexing of plans and transitions from one point of choice to another.

Filtering efficiency gains might be even more problematic. We need a notion of worsening the state of the others.

The real difficulty is connected however with comparisons of the stacks of actions at different points, for *different* individuals[77]. These actions are potential actions. Only the action at the top is an actual action. It is a pure supposition to say that an action is on the second position for a given individual. The problem is not only one of incomparability, but of lack of elements to compare. The elements exist only in the formal reconstruction of the choices.

To ask the individuals to make a list of their options is something totally out of the scope of the theory of action.[78] This means to compare opinions.[79]

The problem of collective efficiency will come back in this book. We might even say that it is the kernel of the whole discussion.[80] Basically, our insight in the following chapters is that only a free market without any further corrections, not a system of computations on paper, makes sense.[81]

Before attempting however to unfold the argument anticipated above, we have to discuss rules and knowledge. Presumably, rules affect efficiency and knowledge is involved in the very execution of any individual action.[82]

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[77] Supposing obviously that we are able to indicate criteria for personal identity.

[78] As David Friedman points out "If we decided on economic policy by asking people how much they valued things, and if their answers affected what happened, they would have an incentive to lie"(Friedman 1990, p.443).

[79] This would also complicate further the model because it involves an assumption according to which something that we might call *collective welfare* exists.

[80] See the analysis of the problem of planning.

[81] Please note that we do not resort to a bureaucrat-god as in(Friedman 1990, pp.445-446). In the second part we prove that the ideal bureaucrat is logically impossible. The difference tends to be, on the long run, between an argument in favor of the market economy focused on efficiency and an argument focused on liberty.

[82] It is interesting, from the perspective of the problem of collective efficiency to look at the Austrian criticism of the mainstream concepts of efficiency. See (Cordato 1980) for this. See also the second part here (pp. 81 ff).

Chapter 4

Institutions as Rules

For the moment, we will state just as a simple convention that institutions are rules. This is far from being, in ordinary language, the main sense of the word 'institution'. The WordNet dictionary lists "organization founded and united for a specific purpose" as the first sense of 'institution' and "a public or private structure . . . including buildings. . . " as the second sense. The third sense is "tradition" and the examples are "the institution of marriage" or "the institution of slavery".[1]

We will distinguish between institutions and organizations and we will ignore any connection between institutions and buildings. Institutions as buildings are certainly not interesting entities here.

Marriage is instead a good example of institution. Slavery is also such an example. The only correction of ordinary usage, in this case, is that we are not interested in the customs or traditions.[2] We are interested in the rules of marriage and so on.

Our paradigmatic example of institution is property. Obviously, no building is involved here and no single organization is identified

[1]The WordNet is a path-breaking form of dictionary. It uses a computer model for semantic relations and offers a convenient database for programs that work with English or other natural languages. The coordinator of the team that created Wordnet is the famous psychologist George A. Miller, one of the fathers of cognitive science. For a presentation of the WordNet project see George A. Miller, "WordNet: A Lexical Database for English", *Communications of the ACM* 38, no.11(November 1995) pp.39–41.

[2]We should pay however attention to the force of tradition and public opinion as enforcers of rules or norms. Robert Axelrod discusses the impressive example of Alexander Hamilton, who writes down, in the night before his duel with Burr, his reasons against duel. But he participates in the duel and dies. There was a powerful norm, supported by the general public, despite its illegality. The power of such an informal institution was still very great in 1804. See(Axelrod 1986, p.1095).

with property.[3] Property seems to be an ideal example of a system of rules.

4.1 Rules as Constraints

There are at least two meanings of the word "rule" that might show up in a book like this. We might talk about rules as ingredients of the knowledge that we need in order to perform a complex action. Any complex action is a sequence of steps governed by rules. The other meaning is used in the case of institutions.

In order to avoid possible confusions, we will not use, as far as possible, the first meaning. Anyway, the context should indicate clearly if we are using this meaning and not the second one.

The second meaning deserves careful examination. In this case, "rules" are constraints.[4] We do not envisage any mysterious technical sense of "constraint". A car that has a device that restrains movements, for example, is constrained.

The real problem is the object of the restriction or restraint imposed by a rule. If we think that rules are constraining individual actions there are serious problems. Any individual displays a certain pattern of choice. No further clarification is added if we talk about a rule as constraint followed by the individual. Even if we take into account transitions from one choice point to another, things are not changing very much. This is simply part of the choices of the individual.

On the other hand, it would be an unfortunate confusion to talk about the plans for complex actions as "rules". This is the first meaning of the term "rule", as we have mentioned above. Total confusion would set in if we would talk about plans as some kind of "constraint" applied to complex actions.[5] Thus we keep terms like "rule" and "constraint" only for the sphere of interactions.

The situation changes if we talk about interactions. Now, individuals are not only agents, but patients too. There are actions of other individuals

[3] It is also very important to remark that "property rights do not refer to relations between men and things but, rather, *to the sanctioned behavioral relations among men that arise from the existence of things and pertain to their use*"(Furubotn and Pejovich 1972, p.1139). For an introduction to the problems of property from the point of view of institutions see Pejovich (1990, chap.1).

[4] According to North (1991, p.97)"institutions are the humanly devised constraints that structure political, economic and social interaction".

[5] This use would completely obliterate the meaning plans.

that an individual would like to restrain.

Rules are constraints that restrict interactions. These are the institutions.

Property is a good example. Let's say that *x* owns a laptop. Others might like to write on the laptop, but they are restricted by the rules of property. They cannot take the laptop or write on it, without *x*'s consent. The form of this consent may be very complex (some kind of elaborate contract). Property is a very complex institution.

4.1.1 Constrained by Law

Historically, traditions and the orders of the authorities seem to be the source of rules. It is very difficult to grasp a third kind of source - impersonal laws.

Herodotus is telling us a very illuminating story in which Xerxes explicitly formulates the idea that the only way of leading people is through orders issued by someone like him. He is told that Greeks obey the law, but he is not able to understand the idea.[6]

The idea of obeying a law, not a human being seems to separate Western civilization from Oriental despotism. It does not sound "politically correct", but behind this difference lies the great divide between liberty and all kinds of forms of oppression.

4.1.2 Arbitrary Power

In the rest of the book, when we talk about rules, we envisage something similar to the law evoked in the story told by Herodotus. It is a prescription or a restraint that is impersonal and it is not dictated by the whims of a powerful person.

Whims are not, strictly speaking, rules. Even if people follow the orders of a powerful dictator, the desires of the tyrant do not become rules. It is rather a process of substitution of the agents. The dictator substitutes a lot of agents. He chooses, they do not choose anymore. He plans, they do not plan anymore.

One of the intuitions behind the text of this book is that the concept of order is meaningless in the case of human relations. Human action does

[6]The episode is in the Book VII, ch.104, sec.16-21 of the *Histories* of Herodotus. Herodotus uses in Greek the term *nomos* and says that Greeks fear the law more than the Persians fear Xerxes.

not just produce order in society; it speculates possibilities. The results of these speculations have unintended consequences.[7]

The former communist dictator of Romania, Nicolae Ceauşescu, used to travel a lot through the country. He tried to make order. He demolished houses and ordered new buildings to be erected in their place. Factories had to be constructed where he ordered. He even took care of minor details, such as the windows of the balconies of apartment houses. He instructed his henchmen to remove such windows from the balconies. This was not order. It was simply the way he liked cities to look like. It was an example of pure arbitrary power.

Arbitrary power itself, even more than the secret police, has a frightening effect. People are impressed by such a substitution of millions of wills with one will. They think that this is order and real coordination.

The much more subtle coordination made possible by law eludes ordinary analysis. Law is expected to have the same kind of effects and to produce some "order" that conforms to the "will of the people".

4.2 Rules and Efficiency

Rules are not actions. As such they are not efficient or inefficient. Now we face a dilemma that we have already investigated. For some authors, it makes sense to ask if a given set of rules contributes to efficiency or not.[8] I think that the basic message of the new institutionalism is that rules are selected and have to be selected on the basis of their contribution to efficiency.[9]

[7] This observation should also clarify why we have chosen the phrase "unintended consequences" and not "spontaneous order". Obviously, one may like the consequences of the complex actions of the members of some society and talk about the wonderful "order" he saw in that society. But he is wrong. He just *likes* the consequences.

[8] David Friedman argues that this was the gist of Marshall's approach. "Marshall's argument starts by considering some change – the imposition or abolition of a tariff, a revision of the tax code, a shift in tort law from strict liability to negligence. The result of the change is to make some people better off and some worse off... if total gains were larger than total losses, we would describe the change as an economic improvement... (Friedman 2000, p.18)

[9] David Friedman (1987, p.144) writes that economic analysis, when it is applied to sets of rules, leads to three aims: (1) to predict the consequences; (2) to identify the *most efficient rules* in a given situation; (3) to predict what rules will be actually adopted. Further, David Friedman points out that it is controversial "that the sole purpose of law should be to promote economic efficiency"(Friedman 1987, p.145). For the complex perspective of the new institutional economics see Eggertsson (1990).

4.2.1 Unnecessary Efficiency

Let us go back to the example of (private) property. I will use again, as an example, the case of the laptop.

One possible argument in favor of property is that it makes possible a reduction of the costs of defending the laptop.[10] When there is no institution of property, the individual x has to defend all the time the laptop. He carries the laptop with him and even sleeps with the laptop under bed. Being with the laptop all the time is a cost that is eliminated by the institution of property.

The hidden supposition in such arguments is that, for all the individuals, all the time, being always by the laptop is a cost. We might however imagine an individual that has a laptop addiction. She likes to be with the laptop and work with it. She is connected with the laptop even when she sleeps. For this person, keeping an eye on the laptop is merely a byproduct of her passion. The rule of property brings no gain in efficiency in this case.

In the case of property rules, a very popular version of the efficiency argument is the claim that property rights affect the allocation and use of *scarce* resources.[11] Specifically, private-property rules are making possible

[10]There is an excellent thought experiment in (Friedman 1989, pp.152-153):"Consider a free-market society in which theft does not exist". This means that there is no set of rules that is forbidding theft. Theft is in this society a profession like any other profession. If you can grab something, then it is yours. Of course, you have to pay attention to other thieves. Now, what are victims losing in this imaginary experiment? The point is that there is more than transfer of wealth in such a society: "victims are worse off by the entire amount stolen, which is at least as great as the total wages of the thieves. In addition, they pay the cost of burglar alarms, police, and other expensive concomitants of theft. The net effect of theft has been not the transfer of income but the diversion of labor from productive to unproductive uses, which reduces the total income of the members of the society by about the amount stolen"(Friedman 1989, pp.152–153). This is a very subtle point. Consider further a similar thought experiment, but this time all the members of the society have a peculiar gene that makes them unable to engage in any kind of theft. Obviously, there is no transfer through stealing in these conditions. But also nobody buys burglar alarms or any other devices or services designed to prevent theft. Since genes are preventing theft, one cannot speak about a rule that would be tacitly adopted by the members of this society. But they are enjoying obvious benefits and we do not have to resort to any kind of calculation at a collective level in order to reach this conclusion.

[11]It is interesting to note that an author as Svetozar Pejovich embraces this type of theory in his early writings (Pejovich 1990), but seems to evolve to a different position in later writings. For example,(Pejovich 1997) and (Pejovich 2001b) provide evidence for a shift toward a different view, influenced by Public Choice and the Austrian School. This shift is especially interesting since it takes place in the context of a discussion on the transition to liberty in Eastern Europe.

those arrangements in which those who desire most a given resource do actually get it.

The efficiency argument in favor of property is formulated within the framework of empirical theories.[12] It is quite different from an argument based upon pure formal arguments. What we are looking for in what follows is a minimal common ground, because even the empirical approach must have a theoretical core. How would it be otherwise possible to formulate empirical hypotheses? A simple collection of facts would be quite uninteresting.[13]

4.2.2 Efficiency Is Not Enough

Traditional arguments against efficiency as a criterion for rules try to show that efficiency is not enough.

Let us suppose that a very detailed rule concerning security has been adopted by a state. Researchers also show that, empirically at least, the

[12] *Liberty* 3, no.6 (July 1990) hosted a very illuminating dispute between Sheldon Richman and David Friedman. Richman stresses that "rights define a moral boundary around each individual to protect him from other man"(p.39). There is a key phrase in this sentence: moral boundary. First, the perspective is *moral*; it is not the efficiency perspective. Second, what is defined is a boundary that we may interpret as a constraint on the actions of others. In his answer, David Friedman replied that "law either should be or tends to be economically efficient, and the exploration of what legal rules are economically efficient, are central elements in the Economic Analysis of Law, arguably the most important, and almost certainly the most controversial, development in the legal scholarship of the past thirty years"(p.50). David Friedman did not argue that natural rights are not provable, but that they are not useful for answering *certain* questions. He also argues that questions concerning property are not the only relevant questions. Contract law or tort law and so on are also part of a web of institutions that play a role in any society. If we look into Friedman (1989, p.184), we see which is the nature of the answers to these questions: "Even if utilitarianism is not true it may still be useful. There seems to be a close correlation between rules that make people free and rules that make them happy". The correlation is empirical, not a priori as in the case of the natural rights approach.

[13] For the moment, let us note what we can extract from a view like this: "The desire of several people to use the same resources for different ends is the essential problem that makes property institutions necessary"(Friedman 1989, p.4). In our formal model these several people perform some simple actions or have plans for complex actions. Let us suppose that these plans are incompatible. It is impossible to execute all of them. Now, the idea is the same: property rules exclude some plans for action. I have a house that is painted in blue. You want to paint it red. I don't. Anybody who respects the rules of property would reach the conclusion that the house should remain blue.

Please note that there is no talk in the above argument about the total happiness of those involved in making incompatible plans. Maybe the disutility of my house being painted in red is not significant for me, while it would make the other person extremely happy. The model, as we have already seen, cannot make sense of such questions.

rule is a contribution to efficiency. It happens that it leaves room only for the most efficient actions of the individuals. Liberty, however, has been completely suppressed.

In this case, efficiency is not sufficient. We have an intuition that liberty may also count. It is more difficult to show that liberty must count. We will try to prove this in the second part of the book.

4.2.3 Efficiency, Rules, and Computations

Caveat emptor is one of the most well known examples of rules. The buyer has to be careful. There is no warranty, no "money back".

Under caveat emptor, however, as a buyer, I have to pay less. If one is lucky or has a better knowledge of the market, then this is the way to be efficient.

Caveat venditor, on the other hand, tries to protect the consumer. But it raises costs. It is however efficient for those individuals who are not able to investigate the market in an adequate way.[14]

Let us suppose now that, for the same product, there are a few competent buyers. For them it is efficient caveat emptor. The vast majority of buyers makes mistakes and, for these buyers, it is efficient caveat venditor.[15]

Now, the tricky problem is to compute efficiency for all the buyers. If there is no criterion for collective efficiency, then the computation is not possible.

Freedom of contract seems to be the best rule, since it leaves for everyone the possibility to be efficient.[16] We may do the same operation as in the case of property and extract elements for a minimal set of rules in this case. The minimal set includes a freedom of contract rule.

In contrast with the case of property, we have now elements for extending a bit further the model. Suppose that the two sides agree to act under the caveat venditor rule. Because we do not have yet money in the model, we simply suppose that the seller agrees to replace the object that he has sold or to compensate with some services the damages of the buyer. Thus

[14]The whole example and analysis are inspired by David Friedman (1987).

[15]For more details and a connection with the case of the relation between landlords and tenants see Werner Z. Hirsch "Renting" in Bouckaert and Geest (2000, vol.3, especially p.927). Hirsch's contribution is one of the sections in part V of ELE - the part that treats regulation of contracts. One can find there more relevant cases for the type of discussion that we have opened here.

[16]David Friedman (1987) suggests that all the law could do would be to offer a default contract.

they agree to follow a *common plan for a complex action.* The plan includes an 'if' or more conditionals like this: if the object does not function more that x days, then the seller will replace it. What is significant for us is that this is a common plan; it is not the plan of one individual.[17]

When we included individual plans in the model, in order to have a concept of efficiency for them, we had to refer to reflections of other choice-points in a point. We may do the same now, but for all the sides of a common plan of action. The plan is efficient if and only if each side has no better choice at each choice-point that is reflected in the point at which the sides agree to follow the common plan of action.[18] There is however no collective calculation of efficiency. Everyone does her own analysis of the plan. And they demonstrate their agreement with the plan through some action. Thus everything is still kept within the limits of a minimal model of human action.

4.3 Formal versus Concrete Rules

The idea of order is in focus in what follows next. We talk about the order of the words in a dictionary. We try to make order on our desk. We discover order in a crystal.

In all these cases and others the notion of order makes sense. It makes sense to ask if the words are in lexical order or not. Is there however any sense in asking the same type of question in the case of a society?

Of course, it is nothing unusual to speak about the order in the streets. People tend to mean in this case that there is some customary state in the streets (no violence, car crashes etc.). This is the "law and order" concept.

Any action plan of a complex action demonstrates an order. There is

[17] Steven Shavell "Contracts" in Newman (1998, vol.1, p.436) defines a contract as "a specification of the *actions* that named parties are supposed to take at various times, as a function of the *conditions* that then obtain…". Our idea of a common plan of action would just slightly more general, because it refers to points or possible worlds in a universe, not just to time. We also use the idea of a control structure of the flow of actions. The conditional control structure has as a left side a condition that might be true or false at some point and as a right side an action.

Further, Shavell defines the concept of an *efficient* contract: "A contract in some relevant class of feasible contracts is called *Pareto efficient* if the contract is impossible to modify (within the class of contracts) so as to raise the expected utility of both of the parties to it"(*ibidem*).

[18] This is contract efficiency as defined above, but without the notion of expected utility. The sides do examine the stacks of possible actions at points of choice within points of choice and balance all the benefits and costs that are involved.

an order in the steps that are followed. The plan includes control structures that make possible an orderly execution of the plan.

On the other hand, if actions speculate the accidental, the possible, then there is no intrinsic order. Individual choose their aims. There is no criterion beyond their choices. Otherwise we cannot speak about choices.

Do interactions exhibit a certain kind of order? Yes, but this depends on agreements.[19] The individuals who interact may agree on certain aims and procedures. Shared choices are possible and this and only this creates the conditions for speaking about an order in the interaction.

Beyond this, our intuition is that it does not make sense to speak about order. But we have a long way to go before we can say that we have proved something about this meaninglessness of the concept of order in society.

Summing up, we may say that when you apply a concept like order there are three cases that we must take into account. It may be true or false that there is order. See the case of lexicographic order in a list of words. The second case is that of a choice or an agreement that creates an order. In the third case it makes no sense to apply the concept of order.

4.3.1 Kinds of Order in Society?

Hayek introduced the idea of two kinds of order in society.[20]The idea is quite simple. On one hand, there is the artificial order created as a result of some deliberate intervention.[21] On the other hand, there is the natural order that nobody created.[22]

The problem raised by this distinction is the following: if the first order is not really an order, then the second kind of order is not order too.

It is quite easy to show what is wrong with the first order. It just reflects the choices of an individual. If there is a rule that forces other individuals to follow that choice, then all the individual plans of action has to respect the choices of the "ordering" mind. It is just a way of forcing others to adopt certain plans of action.

In order to explain this idea one should go back to the concept of action as speculation of the accidental. Let us think literally that the problem is how to cultivate a portion of land. One can cultivate potatoes or cabbage

[19]See above the concept of a common plan of action. Agreement is the key there if we want to make sense of the idea of efficiency of a plan.

[20]Hayek (1964).

[21]"Order, to the ordinary person, is the result of the ordering activity of an ordering mind"(Hayek 1964, p.3).

[22]"...it is an order which, though it is the result of human action, has not been created by men deliberately arranging the elements in a preconceived order"(Hayek 1964, p.3).

on that land or something else. If one chooses to cultivate potatoes this is just a choice. It is a matter of taste and so on. To use the concept of "order" in such a case would just inflate without any reason our model. We want to keep that model minimal. There is no reason to add a new concept beside that of choice and, probably, posit some entity – *order* – that would be created by choices and plans. Obviously, states of the world do change as a result of human action, but this is all we need in the model. If a powerful man imposes his choice, this is the way of action of a tyrant. He chooses for the others. And this is all.

Let us now think about individuals who are not coerced to choose in a certain way. They may agree to cultivate land with cabbage. They have a common plan for a complex action. But this is nothing else than their mode of speculating a possibility. It is the result of their agreement. No order is revealed or created by their agreement.[23]

4.3.2 Rules and Evolution

Behind the passion for the search of a hidden, natural order seems to be the model of the biological order. The society is not however a forest of trees or a population of animals. People can change their traditions, even the most entrenched ones. They can change everything, making things worse or better.

What seemed also to tempt many theoretical minds is the concept of evolution. But the fact that it makes no sense to look for an order toward which the process is going does not mean that it is senseless to look for an order in the process itself. Therefore it makes sense to try to understand the evolution of rules. Evolution might be an explanation of the rules that people have tested, selected and adopted.[24]

[23]The subtle slippery-slope that is involved in the idea of "order in society" is illustrated by the following excerpt from Hayek: "In the case of social phenomena, such as language, the fact that they possess an order which nobody has deliberately designed and which we have to discover, is now generally recognized. In these fields we have at last outgrown the naive belief that every orderly arrangement of parts which assist man in the pursuit of his ends must be due to a personal maker"(Hayek 1964, p.5). The important idea here is that natural language has no personal maker. Then comes the implication that rules that assist human action have no personal maker. This is also an important observation. But language or rules only assist human action. The ends of human action themselves are not part of an order. It is important to attain them in an orderly manner. It is for this that rules are necessary. Of course, Hayek does not believe either that ends are part of an order. He is pointing to an order in the process of aiming toward something that has no order in itself.

[24]For a discussion an examination of evolutionary processes that involve both norms

Despite its limits, evolution could explain up to some point the workings of the institutions.[25]

4.4 Two Types of Interactions

Much more useful, it seems, is the distinction made by Hayek between two types of rules. We will adapt it to our terminology and talk about concrete rules and formal rules.[26] Obviously, he correlates the two types of rules with the two types of order, but we would like to combine them with two kinds of interactions.

In the first type of interaction the participants perform actions at the order of one of the participants or at the order of some external individual or individuals. These interactions have a pattern that is specific and it is governed by a rule that does not allow changing it. Parents who arrange the marriage of their sons and daughters offer an example of such an interaction.[27] Bandits who force you to give them your money are also illustrating this type of interaction.[28] The tyrant who orders people to march in the streets and shout his name also illustrates this idea.

The second type of interaction is based on agreement. Its perfect exemplification is a commercial transaction. Associations of various types may display also the same kind of interaction based upon agreement. Voluntary interactions may follow a specific plan of action, but the sides have agreed to follow it. It is the choice of each participant in the interaction, not a unilateral decision.

The rules that govern these two types of interactions are either concrete or formal. Rules are restraints. When somebody tells you whom you

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and metanorms seeAxelrod (1986). Robert Axelrod used simulations in order to prove that the existence of a metanorm generates a protective environment once a norm is established(Axelrod 1986, p.1102).

[25]Vaughn (1984) argued convincingly that for simple societies the evolutionary argument might work. In the case of complex societies Vaughn showed that the evolutionary argument is implausible. Specifically, she pointed out that in politics there is no evolutive process through which rules are selected. The result of group pressure is quite opposite to what the evolutionary argument would try to make us to believe.

[26]For the whole, complex conception on rules and their role in society see Hayek (1982).

[27]This is more than a plan of action. The parents create a framework for all kinds of interactions. They might draw up some detailed plans, but they also initiate a framework of rules.

[28]The bandit however makes a plan for you and forces you to follow that plan. Of course, in other situations, he might also create a web of rules for a sustained interaction.

should marry the restriction is very concrete. When the dictator tells everybody that they should not glaze their balconies, again the restriction is very specific. The plans made by communist governments used to be much more general, but they too contained detailed concrete rules.

Rules of property constitute the opposite example. These rules do not specify who owns what. They are formal rules. These rules also restrict the patterns of interaction, but they stipulate no specific plan of action.

Formal rules, on the other hand, leave, by definition, a space for choice. It is impossible to have an interaction that is following a certain imposed pattern and is, at the same time, not governed by concrete rules but by formal rules. We will come back at the end of the chapter to this question.

Thus, if we combine the two kinds of interactions and the two types of rules the result is a threefold combination: (1) interactions with an imposed pattern and concrete rules; (2) interactions with an agreed pattern and concrete rules; (3) interactions by agreement and formal rules.

It is important to note that we talk about interactions, not communities, collectivities, groups or societies. Societies are made up of various kinds of webs of interactions.

In the second part of the book we will show that a certain form of patterned interactions is logically impossible and leads to arbitrary power. The rules of arbitrary power are concrete and indistinguishable from the choices of the person or persons who are in power.

4.5 Open and Closed Interactions

We make also a second distinction between types of interactions. But this time we should keep in mind that interactions have a complex and dynamical character. Informally, we will talk about webs of interactions. These webs are also interactions, but they take into account the possibility of generating new actions and interactions that are either part of the web or they lead out of the web.

If all the new actions and interactions are also part of the web, then the web is closed. Adding new interactions is an operation, formally resembling very much the operation of addition in arithmetic. If we add two natural numbers, the result is also a natural number. The idea of a closed web of interactions is formal and has no direct connection to political philosophy.[29]

[29] Popper (1945) writes a lot about the *open society*. Popper follows an individualistic methodology and, of course, "society" is not some object that has its own irreducible

A web of interactions may generate actions or interactions that are not part of the web itself anymore. Again, this is a formal concept of the theory of action. It is not a concept of political philosophy.

This second distinction clearly shows that classifications of the combinations of interactions and rules may be much more complex that the three combinations that we have listed above. Supplementary dimensions make these classifications more complex.

Of course, making such distinctions is not an aim in itself. The objective is to identify interesting properties of the different types of interactions. But, in order to prove the existence of certain properties of one kind of interactions, we need to outline first differences between interactions.

4.6 Institutions and Organizations

We will distinguish systematically between rules and enforcement. From an economic point of view, enforcement is a combination of monitoring activity and imposing a cost on rule-breakers. At the limit, rule-breakers are eliminated from the web of interactions.

Institutions are rules, not the organizations that enforce the rules. Organizations enforce rules imperfectly and this distinction facilitates the examination of the rule itself. It also makes possible the examination of the rule in a simplified form, not contaminated by the various ingredients added by the organization that enforces the rule.

From the point of view of the theory of action, organizations are webs of interactions, not some kind of static structure. But this introduces an even more striking contrast with institutions as rules. Rules constrain interactions.

The confusion between institutions and organizations stems probably from the fact that organizations seem to make the rules.[30] The rule is enforced partially or not enforced at all. Sometimes what the organization does is the only criterion for establishing the rule.

All this is true from an empirical point of view. From a formal point of view the distinction between institutions and organizations is however useful, because what is under scrutiny is the effect of the rule. It is possible to compare this with the distinction between action and value of an action.

properties. Why use "interactions"? The problem is that society is made up of individuals who are acting and debating. For Popper, confronting opinions is a crucial matter. We prefer to focus on actions, not on opinions.

[30] The criticism of the idea that rules are made by organizations is, probably, the best side of (Hayek 1964; Hayek 1982).

The value of the action is demonstrated only by the action itself. But this does not dissolve the distinction between action and value.

4.7 The Liberty Connection

Individuals are free to speculate in a universe of possibilities. In a world of both causal chains and accidents, they use causality in sophisticated ways and exploit the various potential accidental features of the world. This is natural freedom. It makes possible human action, but it is not the actual subject of our inquiry. We investigate a special freedom in interaction with human minds and institutions. We call it, for short, liberty.

There is a special connection between liberty and formal rules.[31] If the rules are formal, they constrain classes of interactions. All the interactions that may be substituted in the variable places of the formal rule are members of the respective classes of interactions. Within the class of interactions that they constrain, formal rules leave a space for choice.

Choice is an essential feature of human action and it was in focus in this first part of the book. From this assertion it does not follow however anything about the liberty of all the individuals. All these observations are preliminaries to the main argument in the book.

But the existence of formal rules alone does not entail liberty for everybody. At the limit there might be just one formal meta-rule. We call a meta-rule a rule that constrains the formation of rules. The meta-rule might be that everybody should obey the orders of a unique dictator. The dictator alone, in this case, fully exploits the possibilities of freedom.[32] The meta-

[31] Hayek (1982) is again very important for this argument.

[32] Dostoyevsky in his novel *The Brothers Karamazov* (Book V, ch 5) introduces a famous character: the "Grand Inquisitor". The Inquisitor rules out any element that might disturb a presumably perfect order. He even arrests Jesus, when he returns to Earth and argues that

> we alone shall feed them in Thy name, declaring falsely that it is in Thy name. Oh, never, never can they feed themselves without us! No science will give them bread so long as they remain free. In the end they will lay their freedom at our feet, and say to us, 'Make us your slaves, but feed us.' They will understand themselves, at last, that freedom and bread enough for all are inconceivable together, for never, never will they be able to share between them! They will be convinced, too, that they can never be free, for they are weak, vicious, worthless, and rebellious.
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> F.M.Dostoyevsky, *The Brothers Karamazov*, translated by Constance Garnett, revised by A. Yarmolinsky (New York: The Heritage Press, 1933) p.192.

rule is very simple and actually it is a limit case, since the dictator is not constrained at all. He may issue any orders. Indirectly, the subjects of the dictator are absolutely constrained. They must obey the orders and have no choices of their own.

In order to prove more than a certain connection between formal rules and liberty we have to investigate the nature of the webs of interactions. This is the objective of the second part of the book.

Chapter 5

Knowledge and Action

We have stressed the lack of causal determination of the individual's choices. We also claimed that there is no order of a causal type in the patterns of human actions and their results. We cannot explain the gardens of Versailles in a fully causal manner. But we admire their form.

Human action gives form to what might otherwise be the formless mixture of various accidents. We admire the form of the building; or the form of the painting; or the form of the novel; or the form of the movie. Complex webs of actions and interactions created all these forms.

In order to understand how these forms were created it is not enough to look at choices and rules, as we did before. We may explain in this way, for example, tastes as choices. But in order to fully grasp the working of human actions we have to look at knowledge too.[1] There are various approaches to knowledge, not all of them suitable for the investigation of human action.

5.1 Propositional Knowledge

An ancient approach to knowledge is focused on propositional knowledge. Knowledge, according to this point of view is a property of beliefs. True and justified beliefs make up the body of knowledge.[2]

[1] In Kirzner (1997, p.62) there is a distinction between the mainstream view of "imperfect knowledge" and the Austrian view, according to which reducing sheer ignorance entails an element of surprise.

[2] Plato looks for the grounds of our statements. He tries to find out which are the ways of establishing our statements. He starts in *Theaetetus* the classical approach to

An belief, according to the contemporary views in philosophy, is connected with propositional attitudes as states of mind. These states have a propositional content that might be expressed in a sentence. The other component is the attitude toward the propositional content: a claim that the sentence is true.[3] Our claim might be wrong and, in this case, there is no knowledge. However, truth is not enough. The sentence *p*, in our belief that *p*, might be true, but it might be the result of a random choice.[4]

Thus, according to the classical view on knowledge, we need more. We have to justify our beliefs. This justification offers reasons for our beliefs.

There is an internal criticism of this view.[5] We will not insist on the internal criticism because we are interested here in the theory of action. We try to build a theory of the liberty of action. Therefore we need an approach that is focused on actions, not on beliefs.

5.1.1 The No-Justification Approach

Karl Popper has proposed a very popular rival approach to the classical view on knowledge. In contrast to the classical analysis of knowledge, Popper's view gives up the justification requirement.

According to Popper, science starts with attempts to solve problems, not to gather data about a domain. Human beings are problem-solvers. Problem-solving is for Popper the essential human activity.

For Popper the body of knowledge is made up of hypotheses or conjectures. Conjectures are tentative solutions to problems, according to the method usually called "guess and test". One tries to guess the solution. Then the solution is tested.

Instead of justification, this approach demands *severe* testing. You have to try to falsify the conjecture. Any scientific conjecture must be falsifiable, but there is no need for justification. Indeed, justification is impossible. There is no certainty in our knowledge. Conjectures just resist drastic testing.[6]

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knowledge, according to which in order to go beyond mere opinion or guess we have to select true statements that are grounded in a rational way. For more of these aspects of Plato's thought see Nicholas White "Plato" in (Dancy and Sosa 1992). For the standard or classical analysis of knowledge see Paul K. Moser "Tripartite definition of knowledge" in (Dancy and Sosa 1992, p.509).

[3]For the variety of the views on beliefs see John Heil "Belief" in (Dancy and Sosa 1992).

[4]See the classical analysis of knowledge that starts with Plato.

[5]In a short, but very influential, article E.L.Gettier offered counter-examples to the standard analysis. See Paul K. Moser "Gettier problem" in (Dancy and Sosa 1992).

[6]Professor David Miller from Warwick University writes that the emphasis of criti-

This point of view had a tremendous impact on the philosophy of science. It changed our way of looking at empirical theories.[7]

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cal rationalism, the philosophy of Karl Popper:"...unlike that of previous philosophies, is on guesswork as the way knowledge grows, and on criticism as the way it is controlled. Popper himself describes it by saying that knowledge evolves through a sequence of conjectures and refutations, of tentative solutions to problems, checked by searching and uncompromising tests.... Our scientific knowledge, that is to say is not a variety of belief, a dispositional state of the human organism, but more like a separate human organ evolving under the pressure of unremitting criticism. But no means all human knowledge is like this, for we are animals as well as being humans, but critical rationalism will not begin to work if we cannot in some such manner distance ourselves from some of our unspoken preconceptions"(David Miller "Editor's Introduction" to *Popper Selections* [Princeton, New Jersey: Princeton University Press, 1985] pp.10-11).

[7]It is also the point of view of those who stress the significance of the empirical approach to human action. When Milton Friedman wanted to reject the aprioristic philosophy of Mises he contrasted Mises with Popper:

> [Mises' philosophy – n.n.] converts an asserted body of substantive conclusions into a religion. They do not constitute a set of scientific propositions that you can argue about in terms of empirical evidence. Suppose that two people who share von Mises' praxeological view come to contradictory conclusions about anything. How can they reconcile their difference? The only way they can do so is by a purely logical argument. One has to say to the other, "You made a mistake in reasoning." Suppose neither believes he has made a mistake in reasoning. There's only one thing left to do: fight. Karl Popper — another Austrian, like Mises and Hayek — takes a different approach. If we disagree, we can say to one another, "You tell me what facts, if they were observed, you would regard as sufficient to contradict your view." And vice versa. Then we can go out and see which, if either, conclusion the evidence contradicts. The virtue of this modern scientific approach, as proposed by Popper, is that it provides a way in which, at least in principle, we can resolve disagreements without a conflict.
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> Milton Friedman, "Say 'No' to Intolerance", *Liberty* 4, no.6 (July 1991), p.18.

The quotation is interesting beyond the question of Popper's influence. It deserves some comments. First, ironically, socialist authors like Robert Heilbronner recognized that "Mises has won" when the communist system collapsed. Facts were far from contradicting Mises. Second, in order to indicate the facts that would contradict the theory, one has to build the theory itself. The approach that we adopted here is to see the theory of human action as a stratified theory. There is a layer with a core that is purely formal and true in virtue of logical arguments. Other layers have an empirical content. Thus, on one hand, it would be wrong to claim that the whole theory should be purely empirical. On the other hand, of course, Milton Friedman is right: not all the questions are to be solved with logical arguments starting from a few basic principles.

5.2 The Idea Behind a Plan for Action

Think a bit about the way you compute something like $(3+3)\cdot 2$. You need at least two steps: compute the value of the addition ; then multiply the result with 2. The point is that when you perform a complex action you follow a series of steps.

The number of steps involved by a complex action must be finite. Individuals are finite beings and are able to perform in all their life only a limited number of actions.

5.2.1 Algorithmic Knowledge

Computer programs are a nice way of transferring tasks like that of computing the value of an arithmetic expression to a machine. Writing programs means that in an explicit or implicit way you have to indicate to the machine the steps that it has to follow in order to perform a computation.

Steven Skiena says that behind each computer program there is an idea. This is the algorithm.[8] In a less poetical fashion one might say that an algorithm is a sequence of steps that satisfy a series of conditions. There is a first, unique step. Each step that follows after a step has to be identified in a non-ambiguous way. After a finite number of steps the whole process stops. The result might be either that one cannot do the computation or it is the result as such.[9]

The definition of an algorithm resembles closely the definition that we gave to the plan of a complex action. Why did we use two terms? The answer is that, for example, I might know a sorting algorithm, but I may use it for different plans. I may plan to sort the books in my library or I may plan the letters that I have received during the last decade. The plan is the

[8] See the lectures on algorithms by Steven Skiena at <http://www.cs.sunysb.edu/~algorith/lectures-good/ps/all.ps>

[9] A clear and readable introduction to the technical aspects of algorithms and computations is contained in the lectures on Turing machines of the course on "Complexity and Optimization in Operational Research" (2002) by Wilfrid Hodges and Dudley Stark. The authors define a *problem* as a function (p.1). A decision problem is a problem that returns as result a 'yes' or a 'no' (p.2). Then they show how Turing created the concept of computer by analyzing the actions of a human being who calculates the output of a function for a given input. Please note that in the case of functions the output must be always the same when the input is the same. In the case of problems, the answer has to be the same when the problem is the same. Of course, there might be different ways of organizing the computations. The course notes are available at <http://www.maths.qmul.ac.uk/~wilfrid/coor/mycoorweb2.pdf>

algorithm applied to a specific set of data. The plan is the idea behind the action, but in order to make the idea operational I need to know algorithms.

We will call "algorithmic knowledge" the capacity to store, understand and perform such algorithms. In contrast maybe to the machine, humans do understand or would be able to understand the workings of an algorithm. They are able to analyze the algorithm. They are able to modify the algorithm. Individuals are also able to assess, in a given situation, which is the appropriate algorithm.

Algorithmic knowledge is, in this book, the paradigm of knowledge. This paradigm has some obvious advantages. It is connected to action. There is a huge, both theoretical and empirical, body of results concerning algorithms. In order to explain some of the results in the theory of algorithms you do not need complex mathematical tools. Sometimes natural language is enough.[10] But the results are precise and they have a deep significance.

The idea of algorithmic knowledge is part of the effort to keep the loading of the model of human action at a minimum. But, for many readers, I am sure, this leads straight to the concept of a mechanical man.[11] The great illusion is that this mechanical man is the best material for comprehensive central planning. The planners are going to program the mechanical man. But we are going to prove quite the opposite idea.

Our insight is quite simple. If we can prove the impossibility of comprehensive planning for this mechanical man, then it makes no sense to inflate our model. Anyway, non-algorithmic forms of knowledge, if they exist, are not going to make the life of the planners easier. They are only going to make our model less clear and the proofs almost virtually impossible.

5.2.2 Networks and Knowledge

Another objection to the use of algorithms might be that it is not always possible to specify all the steps of an action. This should be even a more

[10] If one reads the works of Alan Turing, the British logician that played a key role in the development of the theory of algorithmic computations, then one will be amazed to see how able he was to develop in plain English arguments the ideas that where elsewhere analyzed with formal mathematical tools. Compare Turing (1950) with Turing (1936).

[11] They think probably that this is like La Mettrie's man. The French philosopher La Mettrie(1709-1751) wrote a paradigmatic work, entitled *L'Homme-machine*, in which he develops the idea that thinking is *"une propriété de notre machine"*. See his *Œvres philosophiques* (Berlin, 1775). There is an English translation on-line at <http://www.cscs.umich.edu/~crshalizi/LaMettrie/Machine/>.

dramatic problem in the case of unplanned interactions. They are not unfolding according to some playscript.

One of the possible solutions of this problem is to use a network. These networks are usually called neural networks. The functioning of the human brain inspired them. The neural network is able to work without following a sequence of steps that are explicitly specified and fed into the network. The network learns and adapts itself to the situation.

We will come back to networks in the second part.

For the moment, let us stick to the idea of knowledge that is used in a network. In the case of the network there is no need to store the entire algorithm somewhere. Only the whole network is able to reach the final result. There is a remarkable analogy here between the network and human cooperation.

5.3 Direct and Indirect Individualism

Those who criticize individualism have a tendency to claim that individualists have a vision based on the exceptional powers of the individual. From the perspective of algorithmic knowledge, the knowledge that individuals use for planning and executing plans, the individual needs certain computational capacities. The critic then argues that this view of the individual is unrealistic and therefore individualism is wrong. We will examine a bit this point of view from the perspective of knowledge.

5.3.1 The Cognitive Powers of the Individual

From the perspective of content, action is very complex. The individual has to assess the aim of the action, to see if there are means for obtaining the desired result. She also has to evaluate the consequences of the action and the efficiency of possible alternatives. Last, but not least, she has to find a meaning for her action.

There are a lot of debates in the social science literature concerning the rationality of action. The supposition is that individuals are rational. They can find the best means for the desired result. Basically, this means that they are able to build an efficient plan of action.

The rationality-view tries to simplify a rich content-oriented view of human action. Its assumptions are obviously unrealistic, but useful for the construction of idealized models.

It has been suggested that a concept of bounded rationality is the solution to this lack of realism. Individuals have, in this view, only limited capacities to assess the aims and the means of their actions. Humans are unable to be efficient; at most they are efficient locally. According to the supporters of bounded rationality, empirical data corroborate this perspective on human action.[12]

The view that we will adopt here is that cognition is both rich and limited. It is rich because individuals are not machines. They have consciousness. They are able to use natural language. It is limited because our ability to calculate is not very impressive. A computer has a huge memory and is much faster than we are.

This is the integral model of a human being. We cut it into layers and use a minimal model, based on choice and algorithmic computations.

Despite their limits, individuals are able to apply algorithms. In the rest of the book, we will exploit a lot the ability to use algorithms.

5.3.2 Direct Individualism

The idea that individualism is based on the assumption that individuals have great cognitive powers is largely a myth. Critics of individualism seem, however, to think that the idea that individuals have exceptional cognitive abilities is the essence of individualism.

A paper by James Child illustrates vividly the problems of direct individualism. Child wants to show that libertarianism has no internal argumentative resources for rejecting fraud. In Child's interpretation, libertarianism is a theory based on direct individualist assumptions.[13]

Fraud is important in Child's argument, but only of casual interest in this context. We only describe briefly Child's distinctions. He calls 'hard boiled caveat emptor standard' what is virtually the lack of any restrictions on cheating. Only force is prohibited. The real distinction is between a weak and a strong fraud standard. According to the weak standard explicit misrepresentations are prohibited. The strong standard adds implicit

[12]The notion of 'bounded rationality' was introduced by Herbert Simon. It is discussed in Herbert Simon *Models of Man* (New York: Wiley, 1957). For a brief survey of the researches on bounded rationality see Jon Doyle "Bounded Rationality" in MITECS(1999, pp.93–93). The on-line version of the article from MITECS at <http://cognet.mit.edu/MITECS/Entry/doyle> has only an abstract, but it includes additional links to useful on-line resources. For example, there is a link to Thomas O'Connell thesis on "Bounded Rationality in Repeated Games and Mechanism Design for Agents in Computational Settings" (May 2000).

[13]See Child (1994).

misleading suggestion and omission with the intent to deceive.[14]

Libertarianism is, for Child, a moral theory of the sovereign individual.[15] According to Child, there is no really systematic theory of libertarianism. He dismisses such writers as Nozick, Narveson, Rand, Rothbard or Machan as authors of brilliant works, but far from even resembling a system like that of Rawls. Since the libertarians have no Rawls of their own, Child decides that he is going to reconstruct libertarian theory from scratch. It is this reconstruction that is most useful for our discussion.

Child introduces a series of axioms. The first axiom is the axiom of self-ownership.[16] The second axiom is the right to own non-self property.[17]

Then Child introduces two kinds of second-order rights. The first right is a right to self-defense. The second right is a right of the individual to defend her own property.[18]

Finally, comes in an additional requirement: the capacity to exercise market competence.[19] This is basically a cognitive capacity and an ability to act in an adequate way in the context of complex human interactions. The corollary of market competence is self-responsibility. Everybody is bound to exercise her competence in human interaction and is the sole bearer of the responsibility for her choices.[20]

The axioms, the rights and the requirements seem to be consistent with the libertarian vision of a free and responsible individual. Child wants to show that the consequences are far from being consistent with libertarian intuitions concerning fraud. Libertarians reject violence and fraud. But, argues Child, the rejection of even weak fraud does not follow from the basic principles as he has reconstructed them.

Child argues basically that the requirement of self-responsibility is inconsistent with a ban on fraud. The details of the whole argument are a bit unclear, but the main point that Child makes is however easy to explain. He takes the three standards of fraud and tries to see if they are compatible or not with libertarian principles.

First, let us look at the strong standard. It has as a consequence the a draft on the actions of individuals as sellers.[21] This is obviously inconsis-

[14] See Child 1994, p.723.
[15] See Child 1994, p.725.
[16] See Child 1994, p.725.
[17] See Child 1994, p.727.
[18] See Child 1994, p.728.
[19] See Child 1994, p.729.
[20] See Child 1994, p.730.
[21] See Child 1994, p.738.

tent with the first axiom of libertarianism as Child reconstructs it.

Second, let us look at the weak standard. Child stresses the importance of looking at this standard in the context of a transaction. The transaction, points out Child, has three moments: an offer, an interval for reflection and decision and acceptance.[22] During the interval for decision the offeree is bound to exercise her market competence. When the offeree has taken a decision the responsibility is entirely upon her shoulders, in virtue of the additional requirement and its corollary.[23]

What Child seems to miss is that market competence works both ways. If the offerer makes a mistake, then after the decision he is bound to stick to the initial offer.[24]

There are many curious features of Child's argument. He seems to miss the role of the knowledge problem in in transactions and the possible libertarian answer from this perspective.[25] If we examine the implications of Child's argument, it seems logical that we would have to reach the conclusion that the consumer has also the obligation to point out the virtues of the product that escaped the attention of the offeree. But, everything is so unbalanced in Child's argument, that one gets the feeling that offerers are very suspect characters. This is, of course, absurd. We all are both offerers

[22] See Child 1994, p.731.

[23] See Child 1994, p.731 ff..

[24] According to an article in the computer magazine *Pc Pro*, April 2002, p. 38, Kodak placed on the Internet an offer for the DX3700 camera, along with a memory card and an inkjet printer at a price of £100, instead of £329. Customers placed orders for the camera, before Kodak corrected the mistake, and Kodak had to sell the camera for £100.

[25] Barnett (1998, p.103) points out that "although the equivalence of force and fraud is both long-asserted and well-accepted by classical liberals, its theoretical basis remains obscure". The reason, according to us, is the direct individualist approach, vulnerable to Child-type objections. Barnett rejects fraud (i.e. what Child calls the weak fraud) because, "with fraud, the buyer's manifestation of consent does reflect her knowledge but the resulting distribution of resources does not reflect the consent that was communicated"(Barnett 1998, pp.103–104). Thus, he claims that the fraud creates a gap between consent and the resources actually transferred. As far as I can see, there is however no answer in Barnett to the objection that, during the negotiation period, the buyer had the opportunity to exert her market competence and that the buyer is responsible for her actions. A possible line of defense against this objection is that the buyer, because knowledge is dispersed, has to to rely, at least partially, on the information that has been communicated to her. The unfortunate effect is that this reduces responsibility. For a discussion on the strong standards see Barnett (1998, pp.104–105). Barnett discusses, however, the problem from the point of view of the flow of information. He argues that, paradoxically, despite the lack of a strong fraud standard, the market provides incentives for an accrued information flow. Anyway, the strong standard clearly interferes with plans of actions of the individuals, in spite of the rule of liberty, which says that they might either disclose or not disclose the information.

and offerees and it is highly implausible that everybody is a Dr.Jekyll and Mr.Hyde.

We are more interested however in the deep presuppositions of Child's reconstruction of libertarianism. His conclusion is that libertarianism is compatible only with the hard boiled caveat emptor standard. But this simply means that there is no ban on fraud.[26] There is only a ban on the use of force and threat. Behind this conclusion lies, however, a feature of the whole reconstruction.

According to Child's reconstruction, the individuals are relatively isolated and they have only moments of short-lived interaction. This system of brief encounters generates asymmetric relations in which those who initiated the interactions are tempted to cheat. The problem is to discover an orderly just arrangement based upon rights and duties that prevent violence, fraud and other evils, such as exorbitant and unfair prices or unfair wages.

We call 'direct individualism' the view that grounds claims of liberty for individuals in their strong cognitive capacities. Reason is, in this case, the typical power of an individual. In Child's reconstruction the key is the market competence.

From the point of view of direct individualism, rational individuals have the capacity to choose and act rationally. It makes no sense to subject them to restrictions since they can agree on such limits in a voluntary manner.

We might call 'weak direct individualism' the position that is similar to direct individualism, but rejects unbounded rationality. This is not however a solution to Child's problem. Weakened market capacity would entail a weak form of the first axiom. Individuals would have to be protected against themselves.

A better solution is to consider iterated encounters. These would the iterated games studied by Robert Axelrod.[27] This is not either a complete solution to Child's problem, since one can argue that numerous encounters are not repeated on the market and, despite this, individualists speak about cooperation on the market and an invisible hand that guides that cooperation.

[26] For the final discussion on the ban on fraud see section 15.3 on page 233 ff.

[27] Axelrod started his researches with repeated prisoner's dilemmas and developed a theory of cooperation. For a survey of these investigations see Hoffmann (2000). In his early work Axelrod din not take into account an assumption of bounded rationality.

5.3.3 Indirect Individualism

The alternative to the presuppositions of direct individualism is to take seriously the idea that individuals act and have a potential for action. Each action affects potentially other individuals. It creates a network in which individuals are connected.

Even Robinson Crusoe, isolated on his island, does things that affect potentially other individuals. He should be the last man in the world in order not to affect potentially other individuals. If he is not the last man, the connections are thin, but they are still in place.

Is there a connection between Tutankhamen and me? Obviously yes, because of the content of his tomb! But it was not his intention to let people like me to know what is in his tomb. The tomb was secret. Carter discovered it and guys like me learned about the content of the tomb.

Now there is a lot of room for many questions. Is this a methodology that is compatible with methodological individualism? As long as all the actions involved are individual action, it is such a methodology. By no means however is this a very important question. Methodological individualism is not a dogma.

The strategy is very simple. Let us admit something that methodological collectivists always claimed to be true, namely that individuals are not isolated. Indeed, they are not because what is really in focus is human action and this is bound to create connections with others.

Now let us consider what is explicit in Child's approach. He wants a strong fraud standard. This means that individuals have to commit themselves to common plans for action.

I wonder how comprehensive must these plans are? Is it possible to offer this book to the readers "as it is", without any assurance that it meets certain standards? I have to compensate them if they find a faulty argument? Maybe I have to compensate them if they dislike some item in the bibliography?

Who is going to plan for the individuals? What cognitive abilities must possess the members of the planning agency? We will prove that comprehensive planning is logically impossible.[28]

Thus one has to go back to the individual. A rollback process will lead us from total central planning to individual plans and their link with the concept of property. Individuals may also make mistakes, they interfere with the plans of others, but they are limited by property rules to their own

[28]It was obviously the great historical merit of Ludwig von Mises to stress the *logical* impossibility of planning.

spheres of action.

The indirect interpretation of individualism stresses the significance of the limits of the human mind of the individual who attempts to grab power. The human mind is fallible. The minds of dictators or censors and so on are also fallible. Therefore their power should be none or very limited.[29]

The argument of the book is of this indirect type. First, we will prove that a system of comprehensive planning of human interactions is not logically possible. Then, we will explore the consequences of this logical impossibility.

[29] I believe that this is the argument in John Stuart Mill (1975). It is also the real argument in Popper. Popper has been the great master of fallibilism.

Part II

Minds, Networks, and Liberty

Chapter 6

Human Action: The Non-Formalized Approach

The Objectives of Part Two This part investigates human interactions starting from the perspective of a colossal plan that would regulate every detail of a web of closed interactions. If this is logically impossible, the consequences for what we have called indirect individualism must be very significant. There was in the 1920s–1930s a classical debate on planning. The most important argument against planning a whole economy, the argument that started the classical debate was discovered by Ludwig von Mises. He worked only with premises and conclusions phrased in natural language. This raises a difficult methodological problem.

An argument can be defective from two points of view. One or more premises are false. The argument is invalid: there is at least an argument of the same form, which has true premises, but leads to a false conclusion. The truth of the premises can hardly be a problem in our situation. We use an what-if type of analysis. We grant to the collectivist as much as he can get; i.e. complete collective control over closed chains of possible interactions (nothing escapes planning!). We have to examine carefully the form of the arguments. This can be done in natural language, as it is the case for the classical logic of syllogisms. If we add formalization or proposals of formalizations, then we get a supplementary source of errors. At any moment, somebody might say that the argument of Mises is not captured because of the formalization itself. We are also cut from other interesting ideas in Mises. The details of the discussion are in chapter 6 ff.

The other important idea in this part concerns efficiency. Effi-

ciency is seen as the result of an economic calculation that shows which plan of action brings more profits and less losses. The calculation is a monetary calculation. It uses market prices, not some surrogates. It solves the problems of efficiency that we have encountered in the first part.

This kind of efficiency has two main characteristics. On one side, it shows how the incentives and the pressures resulting from human interactions are reflected into the individuals calculations. On the other side, it is very prudent and restricted. It does not presuppose the existence of some collective efficiency, backed by a wonderful bureaucrat who gets everything right.[1]

This Chapter's Main Question To use or not to use a symbolic language? It depends.[2] Historical context,[3] research objectives,

[1]When it comes to efficiency, Austrian economics is less inflationary than the mainstream economics. "Austrians see the problem facing society to be that of securing efficiency. But, the important point to be made is that Austrians do not see societal efficiency apart from the efficiency of the individuals that comprise it"(Cordato 1980, p.397).

[2]In the first part, we have tried two things: to emphasize the significance of the formal approach; to keep the basic conceptual framework as close as possible both to mainstream and Austrian economics. The natural continuation seems to be a formal mathematical model. Because we will not investigate such a model, this chapter could also have been called "the problem of the mathematical foundations of Austrian Economics". Pierre Lemieux explains why:

> The new Artificial Social Science approach could bring a welcome revolution in Austrian thinking by importing new mathematical tools and simulation methods. Austrian economics has shown a strong prejudice against mathematics, due partly to a misunderstanding of what they are, and partly to the absence, until very recently, of the mathematical tools required to model dynamic, nonlinear, and chaotic social phenomena. An iconoclast may now dream of the day he will find in print something called *The Mathematical Foundations of Austrian Economics*.

Pierre Lemieux, "Chaos, Complexity, and Anarchy", *Liberty* 7, no.3 (March 1994), p.29.

Actually, the aims of the chapter, as those of the book, are much more modest. We limit ourselves to the resources of philosophical analysis and natural language.
We should however add that the iconoclastic air of the enterprise has been dissipated by mathematical models and simulations of Austrian ideas, at least in their Hayekian version. See, for example, Kerber and J.Saam (2001). As far as know, there are no such examples for the Misesian side of Austrian economics.

[3]For the historical context I have only personal anecdotal evidence. Twenty years ago I used in the analysis of universal political doctrines (i.e. comprehensive plans) a

philosophical insights they all - together or separately - lead to different answers. For those readers who are familiar with graphic or symbolic languages it is obvious that we have been inspired in the first part by logical and mathematical models that are described in symbolic languages. The great problem is indeed the chapter on knowledge. If we intend to focus on algorithmic knowledge, isn't it natural to resort to some kind of formalism? Why no computer simulation? Computer simulations should be possible and they are a test for the claims that we have formulated.

We will not do this. The main reason is that we want to keep in touch with the argument of Mises against planning. Mises was against the use of mathematics and symbolic language in the theory of action. It is interesting to see why.

One should also note that the main objective of this book is not formalized logical analysis of human action. It is to investigate philosophically the problem of liberty. Insights and basic presuppositions are more important here. Symbolic logic would probably add little clarification if any, in this case. Anyway, I have no idea how to use it for this specific purpose. If other have such an idea, I would not object to it however.

On the other hand, in the theory of action most of the Austrian school would object in principle to the use of mathematics. This is very interesting from a philosophical point of view. The presuppositions of this position are in focus in the present chapter.

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strictly formalized language. See Solcan (1983). I had almost no idea about Mises at that time. I read from Mises one or two years later. The term 'pragmatical' in the title was not an allusion to 'praxeology'. But even if I had been reading from Mises, I would still have used the formal mathematical language. For obvious reasons it was safer that way. The topic of the paper was inspired by Popper (1957), but it was also not safe to quote approvingly from that work of Popper. This was another part of the historic context. But it explained the extremely abstract discussion in the paper. Popper, on the contrary, was very specific and his main target was Marxism. If one ascends to a higher level of abstraction, as in logic or mathematics, then Marxism is just one among many other possible examples of universal political doctrines that aim or might have as an aim the comprehensive planning of any human action. Finally, another information should be added about Popper viewed in that historical context. The *Logic of Scientific Discovery* was translated into Romanian by our professor of philosophy, Mircea Flonta, and others and Popper was quite well-known in Romania as a philosopher of science.

6.1 Mathematics in Economics

The rigorous use of mathematics leads to a strict separation of form and content.[4] This is an important idea, because one may use the same form, with different content, and reach conclusions that have the same form, but a different content.

The form, seen in this perspective, is obviously value-neutral, since the can be changed according to one's values. It is less obvious how the combination of form and content of mathematical model can still be value-neutral. According to some authors this is true and mathematical economic models in themselves do not speak for or against the views that populate the political market.[5]

Mathematics was applied in economics especially since the marginalist revolution.[6] The marginalist revolution is the work of Jevons, Walras and Menger. Jevons and Walras used mathematical models, while Menger did not use mathematics.[7] Menger is the father of Austrian Economics.

It is well known that Newton and Leibniz invented calculus. Calculus

[4]This is very ably explained by Gerard Debreu: "... an axiomatized theory has a mathematical form that is completely separated from its economic content. If one removes the economic interpretation of the primitive concepts, of the assumptions, and of the conclusions of the model, its bare mathematical structure must still stand"(Debreu 1986, p.1265).

[5]Debreu points out that "The exact formulation of assumptions and of conclusions turned out, moreover, to be an effective safeguard against the ever-present temptation to apply an economic theory beyond its domain of validity. And by the exactness of that formulation, economic analysis was sometimes brought closer to its ideology-free ideal. The case of the two main theorems of welfare economics is symptomatic.... Foes of state intervention read in those two theorems a mathematical demonstration of the unqualified superiority of market economies, while advocates of state intervention welcome the same theorems because the explicitness of their assumptions emphasizes discrepancies between the theoretic model and the economies that they observe"(Debreu 1986, p.1266).

[6]According to Debreu (1984, p.267) the symbolic date for the use of mathematics in economics is 1838, when Augustin Cournot published the results of his investigations. Cournot was however isolated and Debreu agrees that Walras has the highest prominence in nineteenth century. For the twentieth century Debreu proposes 1944 as the symbolic date. It is the year in which von Neumann and Morgenstern published their famous book on game theory. One might add to that list Arrow and Debreu's own paper "Existence of an Equilibrium for a Competitive Economy" *Econometrica* 22, no.3 (July 1954) pp.265–290, a landmark in the history of mathematical economics.

[7]Henri-Simon Bloch, at the hundredth anniversary of Carl Menger's birth wrote that Menger did "insist on the necessity of exactitude in economic theory, and his remarks on methodology reveal his liking for the mathematical approach. But being untrained in mathematical technique, he used the language of the pure logician who as carefully as the mathematician analyzes the relationships between variables, even though he does not make use of equations and diagrams"(Bloch 1940, p.428).

was not immediately applied in economics. It is only in the last part of the 19th century that calculus and mathematical techniques are systematically applied in economics.[8] Jevons had a very significant contribution to this evolution toward mathematical social science.

The evolution toward mathematical social science was not universally accepted.[9] This is true even today. The arguments are not the same, but the rejection of mathematics is still taken seriously.

Jevons was also a logician and a philosopher of science. He noticed that in order to apply mathematics one has to accept the presupposition that there are some constant features and relations among the elements of the objects that are studied by economics or any other science.[10] Numbers however point to diversity.[11] In the framework that Jevons is putting forth it makes a lot of sense to look, first, for models (that catch resemblances between the objects) and, second, to develop such models and use numbers and their properties, in order to explain various specific situations.

The framework for scientific research of those who reject Jevons's approach must be very different. Would it be possible to use models that have a mathematical structure in a context that is utterly different from that of Jevons and his successors? We think that it is possible, but any such approach can be discussed first in the natural language.[12] Thus our option, in

[8]For a brief introduction to the subject see Shand (1984, p.15ff.). The book is mainly useful as an introduction to Austrian Economics, but in this context it is interesting because it has a different perspective than Debreu or any other mainstream author.

[9]For example, Cairnes, a disciple of John Stuart Mill wrote:"Unless it can be shown that either mental feelings admit of being expressed in precise quantitative forms, or, on the other hand, that economic phenomena do not depend on mental feelings, I am unable to see how" [one can avoid the conclusion that mathematics cannot be applied in social science.] (Apud Shand (1984, p.17)). Cairnes is also quoted in Rothbard (1970, pp.450-451). Cairnes rejected the use of mathematics by Jevons. It is significant that Cairnes talks about mental feelings; presumably they belong to consciousness and cannot be modeled mathematically.

[10]He wrote that "Science arises from the discovery of identity amidst Diversity. ... an isolated phenomenon could be studied to no useful purpose. The whole value of science consists in the power which it confers upon us of applying to one object the knowledge acquired from like objects; and it is only so far, therefore, as we can discover and register resemblances that we can turn our observations to account."(Stanley Jevons, *The Principles of Science* [London: MacMillan, 1900], p.1)

[11]For Jevons, "number is but another name for diversity"(*Ibidem*, p.156).

[12]An excellent summary of the various ways of talking about economic behavior is offered by(Friedman 1990, pp.38-75). David Friedman identifies three main languages: "One may use the language of calculus, making assumptions about the form of the 'utility function' that describes the individual's preferences among different goods and deducing the characteristics of the bundle of goods that maximizes it. . . Another possible language is geometry. Most of us can understand abstract relations better as pictures

this book, is for a discussion that uses no special symbolic formalism.

6.2 Against Mathematics: The Presuppositions

6.2.1 Objections to Measurements

Let us examine first some of the main objections against mathematics applied in the social science and their presuppositions. We will start with measurement. Measurement is essential for a statistical approach.

The human world is changing all the time.[13] We even talked about human action as the speculation of possibilities. Such a culture is definitely placed on a very dynamical ground.[14]

Now, the first part of the objection is that anything we measure in the world of action has a historical nature.[15] If we would be able to measure in some way the tastes of an individual, we would do this at a given point. From the perspective of this point, we cannot anyway tell anything about the tastes of the individual at some moment in future.

A second part of this type of objection is that anything we measure has a local character. The researcher cannot come with some common standard and obtain uniform data. Individuals have such data but they are obtained

than as equations; hence geometric arguments are easier to intuit... The third language is English... Alfred Marshall, possibly the most important economist of the past century, wrote that economic ideas should be worked out and proved in mathematical form and then translated into words; if you find that you cannot put your analysis into words, you should burn your mathematics. Since it is often hard to keep track of quantitative relations in a verbal argument, explanations given in English will frequently be supplemented by tables"(Friedman 1990, p.39). One can easily see in this argument the assumption that quantitative relations are crucial for economic theory.

[13]"Human action originates change. As far as there is human action there is no stability, but ceaseless alteration. The historical process is a sequence of changes"(Mises 1966, p.223).

[14]Mises notes that not only the quality of goods changes, "valuations change too, and they cause changes in demand and production. The assumptions of the measurement doctrine would require men whose wants and valuations are rigid. Only if people were to value the same things always in the same way, could we consider price changes as expressive of changes in the power of money to buy things"(Mises 1966, p.221).

[15]Discussing Fisher's basket, Mises points out that "The prices of the market are historical facts expressive of a state of affairs that prevailed at a definite instant of the irreversible historical process. In the praxeological orbit the concept of measurement does not make any sense. In the imaginary – and, of course, unrealizable – state of rigidity and stability there are no changes to be measured. In the actual world of permanent change there are no fixed points, objects, qualities or relations with regard to which changes could be measured"(Mises 1966, p.223).

using their own local standards.

In these conditions it makes no sense to summarize data. All that we could get would be a series of operations with data that have different meanings. Data are obtained in conditions that prevent any kind of global computations.[16]

6.2.2 Objections to the Use of Calculus

Since the marginalist revolution, as we mentioned above, the use of calculus in economics became quite widespread. The Austrian school however dissented.

In calculus we need continuous quantities. The calculus exploited since the beginning the possibility of working with smaller and smaller quantities.

The objection is that actions, by their very nature, are discontinuous. It is not possible to think in terms like "a bit of that action".[17]

Action operates changes that are discontinuous. Even if I drink a "bit of water", I change the state of the bottle in a discontinuous way.

Only idealizations[18] can give us models with continuity. They are re-

[16] For a detailed criticism of holistic equations and the argument that computations in models make no sense see Rothbard (1970, pp.727–740). See also there the arguments against measurements.

[17] Rothbard (1970, p.263) rejects "the error of treating marginal utility as the derivative of the integral 'total utility' of several units of a good". The point that Rothbard wants to make is that there is no such thing as a "total utility". "This is illustrates one of the grave dangers of the mathematical method in economics, since this method carries with it the bias of the assumption of continuity, or the infinitely small step... The human being cannot see the infinitely small step; it therefore has no meaning to him and no relevance to his action... The relevant size of an unit varies according to the particular situation, and in each of these situations this relevant unit becomes the *marginal* unit. There is none but a simple ordinal relation among the utilities of the variously sized units"(Rothbard 1970, pp.264-265).

[18] The notion of idealization hides even more presuppositions from author to author. For example, Mises writes that "Logic and mathematics deal with an ideal system of thought. The relations and implications of their system are coexistent and interdependent. We may say as well that they are synchronous or that they are out of time.... Within such a system the notions of anteriority and consequence are metaphorical only. They do not refer to the system, but to our action in grasping it. The system itself implies neither the category of time nor that of causality. There is functional correspondence between elements, but there is neither cause nor effect"(Mises 1966, p.99). In contrast, for Mises, a praxeological system is as a system out of time (cf. *ibidem*), but it includes the category of time in it. This view is quite curious. At least, as we know today, it is perfectly possible to build systems of temporal logic (see (Gabbay and Guenthner 1989) or (Gabbay and Guenthner 2001) for a technical treatment of such topics). It is not a problem to include time in our

jected however by the dissenters as unrealistic.

6.2.3 Society Is Not a Mechanical Device

Acting individuals are living human beings. They make calculations, but these calculations have a local character. Individuals can change easily their minds. The result of their interactions is dynamic and under the sign of unintended consequences.

Now, objections against the use of mathematics in social science make more sense if we analyze their presuppositions. One of the most important presuppositions of the criticism of the use of mathematics is that the model works in a mechanical way.[19] At the limit a perfect mathematical model would be able to work literally as the human world. According to the objection, this makes no sense. Calculations in the model can be performed in a mechanical way. A very good computer could do the job.

A profound layer of the objections against the use of mathematics is the rejection of the idea that calculations that could be performed in automatic manner tell us something about society. The idea is that society is not a mechanism.[20]

6.2.4 Society Cannot Be Planned

Another profound intuition of the dissenters was that society cannot be planned. Their arguments were rather different.[21] They shared however the conviction that the job of the planners is absurd.

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models. Our intuition is that not time itself is so much the problem. As one can easily see we have downplayed the role of time. We emphasize the role of possibilities. After all, time can also be analyzed against the background of various possibilities. Time is like a system of tracks through various possible worlds.

[19] Again Rothbard (1970, p.264) is very clearly formulating the idea: "Investigating causes of human action, then, is radically different from investigating the laws of motion of physical objects.". A few pages later the idea is even more explicit, when are criticized those "who attempt vainly and fallaciously to construct economics on the model of mathematical physics, specifically, of classical mechanics"(Rothbard 1970, p.279).

[20] In official economics textbooks in the communist countries, before 1989, ample space was dedicated to the "economic mechanism". While I was looking for documentary material from the West on this topic, I was surprised to see that the very concept did not fit well in the conceptual framework of Western academic economics. Even rather "mechanical" mainstream economics does not refer to an economic mechanism or to a mechanism of the market. And, in the Austrian school, there is an explicit rejection of the idea of an economic mechanism.

[21] See the classical debate on planning in section 8.2 on page 102 ff.

Mathematical models of society could however offer the background for a solution of the problem of the planners. Combined with measurements made outside the market, these computations, if feasible, would be a way of reaching the goal of the planners.[22]

The use of mathematics could justify planning. Planning would be the corollary of the mechanical view of society. The deep meaning of the planning is the presupposition that there are levers which a politician can press and obtain the desired result.[23]

6.3 The Rejection of Mathematics: A Critical Analysis

A very important supposition of the Austrian school is that quantitative data are irrelevant for economic theory. They are exclusively connected with history.[24] The formal theory of action is purely qualitative. It seems that from this premise follows that the mathematical approach has no place in such a theory.

The hidden presupposition in the above argument is the idea that mathematics is a science of the quantitative. This is not true. Mathematics is not only a science of numbers. It is also a science of various structures. Modern mathematics is the science of structures.[25]

[22]Rothbard wrote that "statistics are desperately needed for any sort of government planning of the economic system"(Rothbard 1960, p.659).

[23]The term 'lever' played an important role in the vocabulary of communist newspeak. Party activists talked about and, presumably, looked for all kinds of "economic levers". Sometimes this looked very "liberal". The Party gave not only orders, but relied on "financial levers" as well.

[24]"All economic quantities we know about are data of economic history. No reasonable man can contend that the relation between price and supply is in general, or in respect of certain commodities, constant.... the empiricists... pretend that they aim to learn only from historical experience. However, they contradict their own principles as soon as they pass beyond the unadulterated recording of individual single prices and begin to construct series and to compute averages.... The arrangement of various price data in groups and the computation of averages are guided by theoretical deliberations... Nobody is so bold as to maintain that a rise of a per cent in the supply of any commodity must always – in every country and at any time – result in a fall of b per cent in its price. But as no quantitative economist ever ventured to define precisely on the ground of statistical experience the special conditions producing a definite deviation from the ratio $a : b$, the futility of his endeavors is manifest"(Mises 1966, p.351).

[25]It is also important to stress the fact that mathematics is also a way of thinking. And it is not always a way of thinking about numbers. In his "Mathématiques et sciences sociales"[Mathematics and Social Sciences] *Le Figaro-Économie* 24 October 1997, p. xi

The evolution of computer science is also a telling example. At the beginning it seemed that computers are giant number crunchers. Now it is obvious that most of the computations involve texts and all kinds of non-numerical data.[26]

The second point is that calculus is important in social science, but it is not the unique mathematical tool that has been tried by social scientists. Game theory offered an interesting alternative. It did not replace traditional use of calculus completely, but it had a profound impact on the analysis of institutions.[27]

Society is not a mechanical device. There are no levers on which to press and obtain exactly the results desired by somebody. There are however mathematical models for phenomena that also are not mechanical. The mind is such an example. The fact that we might reject the idea of a mechanical mind does not preclude us from building mathematical models.

Further, the difference between the formal analysis proposed by Mises and the formal mathematical approach is not so dramatic as it seems. The mathematical approach in economics has to rely heavily on logical consistency.[28]

One should add however a note on the role of experiments in economics. Since *Human Action* was first published, a new branch of economics, experimental economics appeared.[29] The problem, it seems to me, is not so much – in the context of experimental economics – to relax the logical standards of the core theory and rely more on the results of experiments, as it is to extend the core and its formal structure with new layers that are open to the pressure of experiments.[30] These layers are not

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Pierre Lemieux points out that simple arithmetic is a tool for calculations, but mathematics is a method for thinking. Lemieux claims that Mises did not understand this distinction.

[26]This is a point made, for example, by Niklaus Wirth, father of Pascal. See Niklaus Wirth, *Algorithms and Data Structures* (New Jersey: Prentice-Hall, 1986) par.1.1.

[27]For a very interesting analysis of the role of game theory in economics see Andrew Schotter and Gerhard Schwödiauer "Economics and the Theory of Games: A Survey" *Journal of Economic Literature* XVIII (June 1980), pp.479-527.

[28]This argument has been formulated by Debreu. He stresses the fact that physical theory may take a lot of liberties with logical rigor and does this. Physics tests severely its theories with the help of experiments. This is not true for economics, according to Debreu. "In these directions economic theory could not follow the role model offered by physical theory... Being denied a sufficiently secure experimental base, economic theory has to adhere to the rules of logical discourse and must renounce the facility of internal inconsistency. A deductive structure that tolerates a contradiction does so under the penalty of being useless, since any statement can be derived flawlessly and immediately from that contradiction" writes Debreu (1991, p.2–3).

[29]See the comment of Vernon L. Smith on Mises (Smith 1999).

[30]Vernon L. Smith adopts a Hayekian evolutionist perspective. But he is also stress-

the results of formal analysis.[31] They aren't either simple historical illustrations of some theoretical tenets. Otherwise, there is an acute feeling that the whole construction is either sterile or simply ideological.

There is a comment that must be added however to the observation that formal analysis in its different versions tends toward the same approach, namely logical analysis (symbolic or non-symbolic logic analysis). If one stresses the role played by relevance[32] in human action, then one is bound to look what makes something relevant or not. These are the human motives.[33] This tends to lead as in the direction of a hermeneutic approach, based upon an interpretation or understanding of motives.

We prefer to look strictly for choices, rather than motives. This keeps the whole enterprise within the boundary of formal analysis.

Last but not least, a negative attitude toward mathematics might prevent the final blow against the idea of planning. If we reject mathematics, then we cut the possibility of a proof that planning is logically impossible. At least, we cut the possibility of formulating it in the terms of a mathematical formalism. Paradoxically, this is rather helpful for the advocates of planning.

6.4 Traditions of Praxeology

Ludwig von Mises called the formal theory of action praxeology. Praxeology as theory of action is a name that covers at least two divergent traditions.

The paradigm of one tradition is "Human Action". For this tradition, praxeology is *a priori* and uses logical analysis in its non-symbolic version. According to our interpretation, there is a lot of formal analysis in

ing that "experimental economics is strongly supportive of Mises's theory of market prices"(Smith 1999, p.197).

[31]But they should extend the core in a consistent manner. From this perspective, the observation of Vernon L. Smith that conscious purposes are not needed in Mises' theory is most perceptive (see Smith 1999, p.200).

[32]See the characteristic expression in Rothbard: "In particular, human beings act on the basis of things that are *relevant* to their action"(Rothbard 1970, p.264)

[33]This tendency is discernible in Rothbard when he writes that "in praxeology we *know* the causal force at work. This causal force is human action, *motivated*, purposeful behavior, directed at certain ends"(1970, p.277). This forces us to make a distinction between 'cause' and 'motive'. Rothbard does not make the distinction, but it is entailed by his analysis. There is no problem with the distinction itself. The distinction is sound. Causes belong to the physical world. The world of human actions is the place for motives. The problem is that if we look for motives, than the whole enterprise has rather a hermeneutical character, not the character of a formal, logical analysis.

this version of praxeology, but there is no use of models formulated in a symbolic language and no use of mathematics.

Polish praxeology is the opposite tradition. In some of its versions, it implies the use of formal symbolic models. Most of those who developed Polish praxeology were logicians and analytical philosophers. For them, logic was the modern, symbolic, mathematical logic. Economists, as Lange, are also part of this tradition that favors mathematics.[34]

Praxeology in Romania is connected with the name of the logician and philosopher Cornel Popa. He developed formal symbolic models of various aspects of action.[35] From this point of view, he is close to the Polish school.[36] In his recent works, Cornel Popa used also computer models of human action.[37]

Mises has been largely ignored in Romania, before 1989. After that year, young enthusiastic scholars began to study his works and translate them into Romanian. Now they have an institute that is dedicated to Mises and his praxeology.[38]

6.5 The Virtues of Natural Language

If one has an idea, then mathematical models of any kind are possible. They are translations into a symbolic language of the respective idea. But we have first to clarify the idea. For this, a discussion in natural language is fruitful.

The present book, on one hand, rejects the cult of formalisms that we find in positivist analytical philosophy. The formal construction as such

[34]For brief introductions to the work of the main Polish philosophers of the twentieth century go to <http://www.fmag.unict.it/PolPhil/MainPhil.html>.

On the site one can find a biography of Tadeusz Kotarbiński, the father of Polish praxeology. There is also there a fair presentation of the socialist illusions that accompanied at least some versions of Polish praxeology.

[35]His main work in this field is *Teoria acţiunii şi logica formală* [Theory of Action and Formal Logic] (Bucharest: Editura Ştiinţifică, 1984).

[36]See, for example, Cornel Popa, "Praxiology, Logic of Action and Rationality of Human Activity" in J.Lee Auspitz, Wojciech W. Gasparski, Marek K. Milicki, Klemens Szaniawski (editors), *Praxiologies and the Philosophy of Economics (New Brunswick: Transaction Publishers, 1992), pp.537–583.*

[37]See, for example, Cornel Popa and Adina Magda Florea, "Human Action, Automata and Prolog", *Studii şi Cercetări de Calcul Economic şi Cibernetică Economică, no.1 (February 1996). The text is available on the Internet; you can find it using a search at <http://citeseer.nj.nec.com/>.*

[38]They have a site at <http://www.misesromania.org>.

may prove nothing. You have to show that what you try to build is significant.

The arguments in the book are formulated in natural language. On one hand, we hope to catch the attention of those who would not read a book that is using formulas of one kind or another. On the other hand, we hope that those interested in building the mathematical models might find the reflections of the book useful.

The style of the book is not only the result of a pragmatic choice. We are convinced that a self-contained non-formalized analysis has its own virtues, as well as its limits. Formalisms or computations that cannot be explained in plain natural language are simply failing to pass an important test. The point of the test is to find out if the argument is significant and really proves what it is meant to prove.

Chapter 7

Minds and Interactions

The study of the human mind may be useful for understanding actions. But it cannot tell us directly very much about human interactions. Human interactions are, in many instances, unintended consequences of the actions of human agents. Understanding the mind of the agent is not going to illuminate in any way such unintended consequences since an individual involved in the interaction has not contemplated them anyway.

There is however something very interesting in the contemporary study of the mind: the formal structures of the models used in the study of the mind. Our hypothesis is that models developed for the study of the mind could play an important role in the effort to explain human interactions.

7.1 The Study of the Mind as an Adventure

The mind is both the easiest and the most difficult subject. It is the easiest subject because we have direct access to the mind. The mind is really here. It is here for me when I write these lines. It is here for whoever might happen to read the text. We both, writer and reader, struggle with the same meanings. And we can follow this struggle. More than this, I try to anticipate the thoughts of the reader and the reader tries to see if my thoughts make any sense. The mind is the ideal ground for philosophical speculation.

On the other hand, the mind is the toughest subject for science because experiments are so problematic in the case of the mind. When it started as an independent science, psychology tried to be both experimental and a

study of consciousness. It resorted to introspection in order to have access to the contents of minds.[1]

Behaviorism abandoned introspection and took the road of fully inter-subjectively controllable experiments.[2]Behaviorists had however to change a lot of the subject itself. In a certain sense, the mind was left behind. They contributed to such subjects as learning,[3] but had great problems with language.[4]

In a way it is rather surprising that the study of language was so important for the way we conceive the mind. After all, language is a social

[1]Psychology, as many other sciences, tried to emulate physics. For this one needs at least to use observation. The following excerpt is very suggestive for the condition of psychological research: "The method of psychology, then, is observation. To distinguish it from the observation of physical science, which is inspection, a looking-at, psychological observation has been termed introspection, a looking-within"(Duane Schultz, *A History of Modern Psychology* [New York: Academic Press, 1975], p.96).

[2]An excellent resource for the classical texts of psychology in general and for behaviorism in particular is at <http://psychoclassics.yorku.ca/>, a site created by Christopher D. Green. One can find there the famous debate between John B.Watson and William MacDougall and papers by B.F.Skinner.

[3]It is interesting to compare behaviorism and economics. Behaviorists also focus on behavior, i.e. human action, in their studies and its role. But they are not interested in choices. Skinner, in his classical "Two Types of Conditioned Reflex and A Pseudo Type", *Journal of General Psychology* 12 (1935), pp.66–77, analyzes the way in which an animal learns to press a lever that releases food. Leaving aside the details of the argument, what is significant in the present context is the transformation of random exploration into a search of the lever. The psychologist is interested in the connections between stimuli and actions. Long chains of such connections are formed during the learning process. The animal (or the individual) learns the steps of an algorithm.

In contrast with an economist like Mises, who stresses apriorism, Skinner or the behaviorist in general is a strict empiricist.

There is also in behaviorism a great temptation. The learning process sketched above leaves no room for freedom. Maybe this is a concept that does not make sense from a behaviorist's point of view. This is exactly what Skinner tells us in his *Beyond Freedom and Dignity* (New York: Knopf, 1971).

The Bantam/Vintage edition of Skinner's book that I have consulted has a very inspired presentation on the cover: "A stunning new plan to alter human behavior". It is indeed stunning. What is stunning is not so much the way Skinner defines freedom as "designed to induce people to escape from or attack those who act to control them aversively"(p.27). If one defines freedom as lack of arbitrary power or focuses on non-aggression, then it is not that far from Skinner's formula. What is stunning is the concept of 'plan'; a plan to alter human behavior! Skinner does not question even for a moment the very possibility of such a plan.

[4]If we examine Skinner and Chomsky comparatively, there is another striking aspect.

Which are the arguments against the plan to alter human behavior? There are two main answers: one is that plans of this type are impossible; the other is that one cannot *alter* human behavior because it is innate. Chomsky stresses the second answer.

phenomenon. No interaction is possible without language. But language has a very intricate structure. How could a young child discover this structure only with the help of the clues offered by the reactions of grown-up people around?[5] The child also needs a lot of inborn structures.[6]

Psychology and linguistics had to work together. From computer science also came a decisive help. Artificial intelligence offered the possibility to build computer models of the mind. Hypotheses about the inner working of the mind can now be tested in a controllable way, without resorting only to introspection. This interdisciplinary approach of the mind is called cognitive science.[7]

Cognitive science has developed as an interdisciplinary approach focused mainly on the individual processing of data. Philosophy, psychology, linguistics, computational intelligence, neuroscience have joined forces in order to make sense of the working of the mind, be it the human mind or an artificial mind or any other type of mind. Of course, minds (at least the human minds as we know them from everyday experience) function in interaction with other minds, but there are methodological reasons for separating the individual mind from other minds.

In the MIT Encyclopedia of Cognitive Science (MITECS), a recent

[5]Noam Chomsky in his "A Review of B.F. Skinner's *Verbal Behavior*", *Language* 35 (1959), pp.26–58 [reprinted in J. Fodor and J. Katz (editors) *The Structure of Language: Readings in the Philosophy of Language* (Englewood Cliffs, NJ: Prentice Hall, 1964), pp.547–578] attacked Skinner's account of language acquisition with this type of argument.

[6]For the relevance of the new study of the mind to experimental economics see Smith (1999). Vernon L. Smith also focuses on the significance of inborn structures.

[7]A recent project built a list of the one hundred most influential works in cognitive science <`http://cogsci.umn.edu/millennium/final.html`>. On top of the list is Noam Chomsky, *Syntactic Structures* (The Hague: Mouton, 1957). It is interesting that Turing (1950) is on the third position and Karl Lashley's study on the serial order in behavior is on position 25.

Why was Chomsky so influential? First, it must be pointed out that Chomsky made a distinction between *competence* and *performance*. This is a contrast between an abstract language faculty and a study dedicated to the actual linguistic performance of the speakers of a language. Theoretical linguistics studies the abstract capacity. In his 1957 book, Chomsky reaches a series of conclusions: "grammar is best formulated as a self-contained study independent of semantics"; "a simple model of language as a finite state Markov process that produces sentences from left to right is not acceptable"; "fairly abstract linguistic levels as phrase structure and transformational structure are required for the description of natural languages"(p.106). These are simple, yet very powerful ideas.

Chomsky undermined completely the behaviorist approach. A sentence is not generated from left to right as a series of words; beyond surface structures, there are deeper structures involved in the game. Behaviorism cannot make sense of such deeper, mental structures.

standard in the field of cognitive science, the social aspects of cognition are taken into account.[8] The topics covered in the encyclopedia include: "1 cognition in a comparative and evolutionary perspective; 2 culture in an evolutionary and cognitive perspective; 3 cognition in an ecological, social, and cultural perspective".[9] In the introduction to this part of the encyclopedia, Sperber and Hirschfeld talk about "population-level phenomena". Cognition is approached from the point of view of population-level phenomena by various disciplines. Sometimes, the perspectives differ notably and are even incompatible. Despite this attention to cultural and social aspects of cognition, these phenomena are not usually in focus in the encyclopedia.

The efforts of a series of economists to develop an aged-based computational economics are not reflected in MITECS. Agent-based computational economics combines evolutionary economics[10] with cognitive science and computer science[11]. A site with a lot of information about agent-based computational economics is maintained by Leigh Tesfatsion.[12]

The study of the mind is an unfinished adventure. Cognitive science, like other attempts before it, has not reached the state of mature theory of the mind. There are however various models of the mind that can be used

[8] See the introduction to "Culture, Cognition, and Evolution" by Dan Sperber and Lawrence Hirschfeld in (Wilson and Keil 1999, cxic-xxxii).

[9] [p.cxi]MITECS.

[10] For the idea of an evolutionary economics see, for example, Nelson and Winter (1982). The authors analyze the evolution of the capabilities and behavior of firms (cf.p.3). For the structure of evolutionary models see pp.14–21. It is interesting to note that Nelson and Winter (1982, p.169) insist that the "concept of 'possible actions' has no standing independent of the actions invoked by decision rules". They also assess the role of both market and non-market selection environments (pp.266–272).

[11] Computational economics uses sophisticated software. A programmable model environment that is both easy to use and has an intuitive graphic user interface is StarLogo. It was designed to help students understand the working of a decentralized system, but researchers can use it too. This is not the old Logo with just one turtle that moves around the screen. The StarLogo programs use many turtles and simulate the functioning of systems that have no coordinator or organizer. It can be used to build models of market economies. The software is available from <http://education.mit.edu/starlogo>.

[12] The address of the site is <http://www.econ.iastate.edu/tesfatsi/>. Leigh Tesfatsion writes that one "principal concern of agent-based computational economics researchers is to understand why certain global regularities have been observed to evolve and persist in decentralized market economies despite the absence of top-down planning and control: for example, trade networks, socially accepted monies, market protocols, business cycles, and the common adoption of technological innovations. The challenge is to demonstrate constructively how these global regularities might arise from the bottom up, through the repeated local interactions of autonomous agents"(in the version of the site updated at 19 August 2002).

beyond the study of the mind itself.

7.2 Side-Effects

Our aim here is to point to some side-effects of the efforts to develop models of the brain and of the mind. The formal structures that have been used in order to make sense of the mind might be very useful as models of social interactions too.

We will not discuss cognitivism, the idea that our minds are like computers, "not merely that our minds, like the weather, can be modeled on a computer, but more strongly that, at an appropriate level of abstraction, we are computers"[13] We shall keep our discussion within the limits of the presupposition that we work with models. The model may be formulated in at least three ways: 1 informally (in natural language and/or graphically); 2 in mathematical language; 3 as a computer program (simulation on a computer).

The presupposition that we emphasized above is obviously weaker than the strong cognitivist perspective. We are interested in the formal structure of the models. It is the formal pattern that, so to speak, can be extracted and used in other contexts than the study of the mind and/or of the brain.

From a philosophical point of view, it is significant to make this distinction between strict cognitivism and the use (or the study) of the models of cognition. One can use or analyze the models of cognition, independently of her/his position toward cognitivism.

7.3 Interactions and their Models

Interactions are the main concern of this book. Next, we will exploit a very simple feature of the class of models that we discuss in this book. Their theoretical basis is the theory of algorithms.

First, we will use negative results in the theory of algorithms in our argument that comprehensive planning of closed interactions is logically impossible.

The next step is to investigate the kinds of interactions that are possible. In this context we will exploit the idea of neural network as a model of social interactions.

Finally, we examine the different systems of rules that can govern possible interactions. We will investigate the role of rules based on agreement.

[13] Brian Cantwell Smith, "Computation" in (Wilson and Keil 1999, p.153).

Chapter 8

When Planning Is Logically Impossible

Despite the very restricted proof announced by the title of the chapter, we have aims that are broad in scope. The title is so circumscribed because we want to establish a firm point from which to start the rest of the argument. Our argument will exploit fundamental results of the theory of algorithms. We formulate first the problem, but before we formulate our own argument, we will make a long incursion into the history of the problem of planning.

8.1 Planning and Interactions

The model developed in the first part started with individual action. Then we have introduced plans for complex actions of an individual. Later the idea of a common plan of action won a place in the model. Finally, we made room for a minimal concept of the idea behind the plan: an algorithm. We simply called 'algorithmic knowledge' a capacity to store a plan and perform it according to the idea behind the plan, according to the algorithm.

When I wrote this text, I did a lot of planning. I have created a database with ideas. I planned the structure of the whole text and even that of single paragraphs. I have identified key-ideas and so on. I also have tried to anticipate possible objections. All this was part of a complex action.

Individuals do make a lot of plans. If their plans are wrong, they have to backtrack and try another course of action. This is absolutely normal.

Planning of common actions is something different. In this case, there is more than one agent. Who is going to decide what is to be done? How

are going the results to be assessed? How are going to be punished those who are not acting according to the plan?

There is a great temptation (perhaps for any human mind) to develop the following kind of argument: individual plans or common plans, taken separately, might each be efficient; why not entrust a planning center with the task of drafting a great, unique, common plan of action? For a vast society, this would be a monumental plan.

It is obvious that the planning of the interactions is affecting individual plans of actions and the plans of particular groups of individuals. At the limit, all individual choice is suppressed. There is no planning of the actions by the individual. Everything has to obey the planned pattern of the interactions.

This is an extension of our former choice-point model, but since it introduces the idea of a planning center we will treat it as a new model. We will call this model 'the planning model'. Its central figure is a hypothetical planner - an individual, a group or even a very well programmed computer. Of course, for our theoretical discussion, the computer would be an ideal computer. It is a finite machine, but it has no speed limits and makes as many computations as possible.

The planning model is a very abstract one. The problem of the logical possibility of planning, in historical debates among economists, was described in less abstract terms. Sometimes it looked like a purely practical problem. This generated the impression that the planning might be theoretically possible, but practically impossible. In contrast, we focus here upon the *logical* problem of planning.

8.2 The Classical Debate on Planning

Around 1920 there was a sort of consensus on the feasibility of planning. This was conceived within the framework of the nationalization of the economy. The institution of private property had to be replaced by collective forms of property. A committee of planners had to be charged with the direction of the national economy.

In this context, the voice of Ludwig von Mises was almost singular.[1] In any case he was the most articulate critic. Ludwig von Mises formulated an argument against planning that started a great debate.

[1]Max Weber is the most notable exception. For an analysis of Weber's position see Hoff (1949, pp.3, 78, 92). Hoff emphasizes Weber's objections to moneyless computations.

Before going on, one should remark that the choice-point model, in this moment, is a moneyless model. The extension that we have operated, the planning model, also is a moneyless model. This has a very good reason. We try to illuminate an important feature of the argument of Mises in its first phase.

Mises makes a distinction between valuation and appraisement. Valuation was the subject of our analysis in the first part, where we discussed a model based on choices made by individuals at a certain point. We have also discussed the concept of price, in the context of interactions. For Mises appraisement is an anticipation of something else; it is the anticipation of the market price.[2]

There is a distinctive Austrian flavor in this distinction. For other economic schools what happened in the past is the most important thing. Production is of paramount importance and is seen as a process of incorporation of activities. Goods are such *incorporations* of past activities. In contrast, for the Austrians anticipating the future is the key. We might say that the real paradigm of human action, from an Austrian point of view, is speculation. Speculation has such a bad reputation in various circles that the enterprise of the Austrian school might really be called audacious. Indeed there the only perspective for understanding anticipations is the speculative one. Future, in an Austrian perspective, is open. It makes no sense to say that you know what will happen in the future. Anticipating is a way of acting.[3]

Now, going back to the argument against planning, we may say that anticipations of prices are a sort of hidden entrance into the intricate galleries

[2]"Appraisement must be clearly distinguished from valuation. Appraisement in no way depends upon the subjective valuation of the man who appraises. He is not intent upon establishing the subjective use-value of the good concerned, but upon anticipating the prices that the market will determine. Valuation is a value judgment expressive of a difference in value. Appraisement is the anticipation of an expected fact. It aims at establishing what prices will be paid on the market for a particular commodity or what amount of money will be required for the purchase of a definite commodity"(Mises 1966, p.332).

[3]Writing on the important topic of the role of entrepreneurial profit and loss in a market economy, Mises noticed that "Like every acting man, the entrepreneur is always a speculator. He deals with the uncertain conditions of the future. His success or failure depends on the correctness of his anticipation of uncertain events. If he fails in his understanding of things to come, he is doomed. The only source from which an entrepreneur's profits stem is his ability to anticipate better than other people the future demand of the consumers"(Mises 1966, p.290). Later, in *Human Action*, Mises writes that "all socialist and interventionist authors and politicians... fail to recognize the speculative character inherent in all endeavors to provide for future want-satisfaction, i.e., in all human action"(Mises 1966, pp.675-676).

of the main argument. For Mises, there is no causal connection between past prices and future prices. We cannot calculate future prices on the basis of past prices. Anticipations of future prices make the difference.[4]

I doubt that it makes much sense to think about social planners as entrepreneurs who try to anticipate prices. Anyway, they have - as Mises has shown - no monetary prices that they could use in their computations.

Calculation using monetary prices does not take place in an institutional vacuum.[5] If the division of labor is an institution that is quite obvious and might be adapted by the planners, the institution of private property has another status. Its connection with economic calculation is less obvious. It is however a crucial connection. Mises shows why in the absence of private property there are no monetary prices.

Prices must have the monetary form and this plays an important role in the argument. Prices are quantities of money.[6]These quantities have their own value and this value, like any other value, might fluctuate. But they have a special quality. Any good can be evaluated in monetary terms on a market.

The market is the next important element in the argument. The exchanges on the market determine the prices.[7] There is no price outside of the market and no possibility to calculate outside the market.[8]

Let us think for a moment that we try to establish a price through a

[4] The prices of the immediate past are for them only the starting point of deliberations leading to forecasts of future prices. The prices of the past do not influence the determination of future prices. It is, on the contrary, the anticipation of future prices of the products that determines the state of prices of the complementary factors of production"(Mises 1966, p.336).

[5]"The system of economic calculation in monetary terms is conditioned by certain social institutions. It can operate only in an institutional setting of the division of labor and private ownership of the means of production in which goods and services of all orders are bought and sold against a generally used medium of exchange, i.e., money"(Mises 1966, p.229).

[6]"Money calculations have their limits. Money is neither a yardstick of value nor of prices. Money does not *measure* value. Nor are prices measured in money: they are amounts of money"(Mises 1981, p.99).

[7]As Mises pointed out, even "government-operated enterprises and the Russian Soviet economy are, by the mere fact that they buy and sell on markets, connected with the capitalist system. They themselves bear witness to this connection by calculating in terms of money. They thus utilize the intellectual methods of the capitalist system that they fanatically condemn"(Mises 1966, p.259).

[8]"The market economy calculates in terms of money prices.. . . The market economy is real because it can calculate"(Mises 1966, p.259). This is a key idea in Mises and we will try to reconstruct it in the form of a connectionist network among economic agents. The network literally performs computations.

pure technological calculation. We express the price as a combination of goods that are necessary for the production of a good. There is a problem. Technology offers us a series of alternative solutions. For example, if I want to draw a diagram for this book, I have a choice among different computer programs. There is no pure technological criterion for this kind of choices.

The problem of technological calculation is that it takes place in a world devoid of human action.[9] More than this, it presupposes a world in which there is no place for human action. It relies on exhaustive causal connections between events as a base for its valuations. Happenstances would create gaps in the valuations and make calculation impossible. Thus they must be absent. But, in this case, human action too has lost its specific space.

We also use economic calculation.[10] But in order to calculate we need a special kind of context or environment. We take into account the monetary price in order to reach a decision based on economic calculation. Economic calculation is also the method for finding out the benefits of an action.[11]

Mises also stresses the problem of complexity. In our terminology, we might say that at each reflected choice point there is a tremendous number of alternatives for a step in the algorithm that stands behind the plan. Mises accepts only at a low level of complexity the possibility of formulating common plans for action without relying on money.[12]

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[9]Mises has a powerful argument against calculation in kind:"...computation in kind as applied by technology is of no avail. Technology operates with countable and measurable quantities of external things and effects; it knows causal relations between them, but it is foreign to their relevance to human wants and desires. Its field is that of objective use-value only. It judges all problems from the disinterested point of view of a neutral observer of physical, chemical, and biological events. For the notion of subjective use-value, for the specifically human angle, and for the dilemmas of acting man there is no room in the teachings of technology"(Mises 1966, p.207).

[10]The concept of calculation is central for Mises. He underscores the fact that "Economics is essentially a theory of that scope of action in which calculation is applied or can be applied if certain conditions are realized. No other distinction is of greater significance, both for human life and for the study of human action, than that between calculable action and noncalculable action. Modern civilization is above all characterized by the fact that it has elaborated a method that makes the use of arithmetic possible in a broad field of activities. This is what people have in mind when attributing to it the – not very expedient and often misleading – epithet of rationality"(Mises 1966, p.199).

[11]"If, under prevailing market prices, they cannot carry through the process at a profit, it is a clear proof that others are better able to turn to good account the instrumental goods in question"(Mises 1981, p.99).

[12]"Only under very simple conditions it is possible to dispense with money calculations"(Mises 1981, p.101).

The socialist society, according to Mises, can be only a very simple society. All complex interactions are bound to disintegrate, since the economic administrators are lost in the maze of production processes that are two complex.[13]

Now it is quite clear which is the gist of the argument. Using the terminology of our reconstruction, we may say that the extension of the choice-point model into a planning model cannot go too far. For complex actions efficiency is not a trivial question. The combinations of choices at all the points relevant for a plan must be evaluated and this task cannot be performed above a certain level of complexity.[14]

8.2.1 Market Socialism

Translated into the language of our models, Mises' claim is that the only extension of the choice-point model is through the introduction of money in the institutional context of the institution of private-property. There is however another possibility: a planning model with money, but without (real) private-property. The more sophisticated critics of Mises have contemplated this extension.

There were two types of attacks against Mises. On one side there were propagandistic claims that Mises is just a bourgeois professor. This way of

[13] "Each commodity produced will pass through a whole series of such establishments before it is ready for consumption. Yet in the incessant press of all these processes the economic administration will have no real sense of direction. It will have no means of ascertaining whether a given piece of work is really necessary, whether labor and material are not being wasted in completing it"(Mises 1981, p.103).

[14] This level of complexity might seem rather impressive to some people, but it is still lower than the level of complexity in a society that uses money. The example of the famous socialist economist Robert Heilbronner is quite telling from this point of view. It took him quite a lot of time to see that socialism cannot cope with complexity. During the collapse of the communist system, in 1988-1989, Heilbronner wrote a series of articles in *The New Yorker* in which he announced that "Mises was right". Later he gave an interview to Mark Skousen for *Forbes* (May 27, 1991), republished in an extended version in *Liberty* (1991 vol.4, no.6, pp.45–50, 69). In the interview he confirms that Mises was right. He said that a "command economy is like the military. The army is very good at moving mountains and doing what the Pharaohs did, building large-scale monuments. They build thousands of miles of railroads and large dams. They brought about industrialization... Socialism can do that. What socialism can't do is to produce the complex array of goods of goods required once a society leaps from a peasant society to an early industrial society"(pp.45–46). Even in this excerpt one can feel a certain admiration for the building of dams, roads and factories. But he fails to make the point that they might not be of use to anyone. There is even a perverse incentive in that economy to build big and useless things.

looking at arguments was quite common during communism too. A kind of sociology of knowledge was applied. Critics looked for the "class origins" of the argument, they did not discuss its validity.[15] On the other side, in the English-speaking world, another kind of debate was launched.[16]

These critics recognized that market prices are very important. They also admitted that a market for consumer goods makes sense. But they rejected the free market based on private property. Their idea was to replace the real market with an artificial market.[17]

The planning model is in fact a planner model. The whole discussion is focused on what can do and cannot do *the planner*: a central agency or - for the sake of a very abstract discussion - a very powerful computer. We leave aside the practical details and concentrate on the data and computation procedures the planner needs to know in order to generate the plan.

There is always an ambiguity in all this discussion. One should not forget that - in the present reconstruction - any complex action involves planning. What we are talking about right now is however a special kind of planning, done by a central processing unit.

In a paper published in 1936[18] and 1937[19] Oskar Lange developed a standard argument in favor of market socialism. From an abstract, formal point of view, there are two crucial moments in Lange's argument. The first concerns the data; the second the procedures of the planner.

According to Lange, the planner needs three types of data: (1) data concerning the choices; (2) prices as "terms on which alternatives are offered; (3) knowledge of the amount of resources available.(Lange 1936, p.54)

[15] Lerner (1934, p.51) quite aptly characterizes this type of critic that denounces Mises' argument as "meaningless anti-socialist propaganda, produced by reactionary professors sacrificing their interest in scientific truth at the altar of class interest".

[16] Lerner (1934, p.52) makes another valuable point when he mentions that it is possible also to say against Mises that "the categories of capitalist economy are inapplicable to the socialist society". This means in fact a rejection of the possibility of a theory of human action. Lerner and other socialists however did not adopt this point that destroys the chance of any rational debate and tried to look at the socialist society with the eyes of an economist (to be more exact, with the eyes of what we call today a 'mainstream economist').

[17] The word 'artificial' should be perceived in this context as a descriptive term, not a value-judgment. One should note that the argument in Lerner, Lange and other market socialists should not be treated "in the reverse" as was treated the Mises' argument. Lerner points out quite perceptively that for the planning bureaucracy the individuals "become more and more a somewhat recalcitrant material for the weaving of social patterns pleasing to bureaucratic aesthetics"(Lerner 1934, p.54). The pricing system is, for Lerner, a cure for this tendency of the bureaucrats.

[18] (Lange 1936)

[19] (Lange 1937)

Data of the first type are extracted from the market. It should be noted that Lange favors a system with a consumer market and free choice of one's occupation. Data of the third type are assumed to be unproblematic.

Prices are the problematic type of data, according to Lange. He quotes Wicksteed and makes a distinction between prices as the money for which an object or a service can be obtained and prices as "terms on which the alternatives are offered"[20] These are the prices of the elements in a choice-set at a given choice-point. The crucial move of Lange here is to make the assumption that "the data under (1) and (3) being given, the 'terms on which alternatives are given' are determined ultimately by the technical possibilities of transformation of one commodity into another"[21].

We have reached now a level of deep disagreement. According to Lange, Mises confuses the two kinds of prices and argues that the lack of prices in the first sense is a lack of prices in a wider sense. But, as one can see from the choice-point model here, the prices Lange is talking about indeed exist, but as prices at a given point and for a given individual.[22]

The second moment in Lange's version of the planner model concerns the procedures of the planner. Lange picks up in this case an idea of Fred M. Taylor.[23] He suggests that the planner should use a *trial and error method*. The planner starts with random prices. Then analyzes what happens on the market. "If the quantity demanded of a commodity is not equal to the quantity supplied the price of that commodity has to be changed...Through this process of trial and error equilibrium prices are finally determined"[24]

There have been a lot of comments on this procedure. It is not practical.[25] The Austrian School objects to the very notion of an equilibrium price. Despite Lange's claims, there are a lot of discussions concerning the efficiency of the system.

The stage is set now for a very abstract discussion. In Lange's model there is recognition of the fact that the planner must change the plan from

[20]The expression belongs to Wicksteed.

[21](Lange 1936, p.55)

[22]In her introduction to Hoff (1949, pp.xxii-xxiii) Karen Vaughn points out that Lange misunderstands Wicksteed's distinction. The "terms on which alternatives are offered" are made up, for a given individual, by market prices and subjective elements. The subjective elements do not disappear. Lange would have probably replied that individuals in capitalism and socialism have the same kind of knowledge or lack of knowledge in this respect.

[23]See Hoff (1949, pp.211-212) for details on Taylor.

[24](Lange 1936, p.66).

[25]Changing prices from the center is a tricky business. The decision might trigger uprisings. This happened, for example, in Poland, Lange's native country.

time to time. But he claims that a central planner might plan as well as millions of individual planners do without relying on some central processing agency for taking their decisions.

If the central planner does resort to trial and error, then what is this planner good for? Lange came up with an answer that is very influential even today. He claimed that the central planner is able to distribute incomes in such a way that reaches maximum social welfare.[26]

Lange's planners are more than imitators of the working of a market economy. Behind the plan is a vision, a conception. For Lange, justice, not liberty, is the criterion that should guide the planner's strategies.[27]

Lange claimed that in his model there is room for the *comprehensiveness* of the items that enter into the price system. His argument is that social costs are better reflected in the assessment of efficiency than they are in capitalism.[28]

Lange also argues that the model is more stable and the planners can prevent business cycles.[29] He even thinks that planning could be more efficient than the market economy, not barely more just.[30]

8.2.2 Hayek's Argument against Planning

Hayek's argument against planning can be presented in direct contrast with the Lange-Lerner model, but it is also apt to offer elements for a useful digression. Basically, the idea is to return to the planner model and give up any concern with the crunching of big numbers. The planner is now interested in a huge central database.

What is going to be stored in the database? All the data concerning individual stacks of actions at choice-points and all the data concerning the reflection in the choice-points of other choice-points. All the data concerning the algorithmic knowledge of the individuals, i.e. what they know how

[26] See Lange (1937).

[27] See Lange (1937, p.124) for such stereotypes as "while some are starving others are allowed to indulge in luxury". The implication is quite obvious. He even argues that individuals should pay a tax for better work conditions.

[28] Cf. Lange (1937, p.125).

[29] Cf. Lange (1937, p.126).

[30] For an emphasis on an argument in Lange, according to which planning could achieve efficiency where private ownership failed see Joseph Persky, "Lange and von Mises, Large-Scale Enterprises, and the Economic Case for Socialism," *Journal of Economic Perspectives* 5, no.4 (Fall 1991): 229-236. In Persky's interpretation, Lange argued that competitive sectors of the economy might remain in private hands, while the rest came under state control. This "rest" is made up from large firms that presumably destroy competition and efficiency.

to do. All the data concerning resources.

There is nothing mysterious about this database. Think about an easy task for our poor old acquaintance, the traveling salesman. This time he has to visit seven towns. The order of the visits does not matter. He may go through a town as many times as he pleases and is not terribly constrained by the available resources (time and money especially). In these conditions, the salesman builds a data-base with a list of the towns, he adds notes about each town, compares towns, notes what towns he would visit first, how he can do this and what are the resources available to him. Then, using the data-base, he generates a plan according to which he will stay in a nice hotel in the town that is right in the middle of the region in which are located the seven towns and just visits them.[31]

The central planner gathers in his database this kind of data for all the individuals. Then he generates a plan. Is this possible? One should note that this is not a question about efficiency. Like the salesman the central planner does not have to bother about efficiency. All he has to do is to come up with a nice plan.[32]

A first objection to the hypothetical database might be that it will tend to be outdated before the plan is actually executed. This objection tends to ignore the nature of a thought experiment. The database is a wonder data-base; it generalizes very skillfully the simple example with the easy task of the salesman.

A second objection might be that the plan itself has a reflexive influence on the database. Like in old jokes from the communist era, the planner has studied scientifically the preferences of many individuals and has learned they would like to have a T-shirt with a cat on it. The planner issues the adequate orders and everybody that desired the T-shirt with a cat gets it. But almost nobody wears it. They don't like the idea that so many people have the T-shirt. The objection is however weaker than it seems. The planner might keep in the database an information concerning the possible impact of a massive production of T-shirts. He just delivers it to who wants it most. And this is precisely what an ideal market should do.

Now it is interesting to look at the Hayek's strategy for answering to this question. He does not use obviously our thought-experiment with the ideal data-base; but he claims that "it must be admitted that this is not an

[31] The German name for Transylvania is 'Siebenbürgen' and means *seven towns.* One may think about a nice trip through Transylvania and plan it this way.

[32] It is like buying an excursion to Transylvania from an ideal firm. The firm just knows if you would like to go to "Dracula's castle" or if you would like to spend more time in ancient medieval towns or visit old libraries and so on. The firm is a perfect organizer and plans extremely well every detail of the trip.

impossibility in the sense that it is logically contradictory"[33].

Planning is, according to Hayek, impossible from a *practical* point of view. He mentions that no manager of a particular firm would be allowed under planning to substitute a good with another good. He has to get approval from the central planner. Thus the central planner has to keep separate registers in the central database for each firm.[34] The central planner has also to keep in the database a description of each product, of the ways to transport it, repair, modify and so on. The task is indeed monumental.

And now comes the major step in Hayek's argument. He notes that planning implies a colossal centralization of knowledge.[35]

In order to correlate all the production processes, the central planning authority has also to do stupendous calculations.[36]He rejects what he calls the "mathematical solution", i.e. the application of mainstream economics mathematical techniques to the problem of planning. Planning is, for Hayek, a unsuitable way of coping with complexity problems in society.[37]This kind of engineering approach makes sense when you build roads, houses or machines, but not when you are dealing with human beings that possess knowledge.

For Hayek, the whole discussion brings into focus the role of knowledge in society. He comes back to this idea in his famous 1945 article, but discusses at a more abstract level, since he addresses the more general question of the nature of "the economic problem which society faces"[38]. According to Hayek, the economic problem of society is "not merely a problem of how to allocate 'give' resources. . . it is a problem of the utilization of knowledge not given to anyone in its totality"[39]

In 1945, Hayek repeats the idea that *if* we possess complete knowledge, the economic problem is one of logic. Presumably, there are no further difficulties. What is really impossible is to centralize the knowledge.

Why it is impossible to centralize all that knowledge? The argument is rather simple. Hayek claims that scientific knowledge is not the sum of all knowledge.[40] The set of all knowledge includes also something that

[33]Friedrich Hayek, "The Present State of the Debate", *Collectivist Economic Planning* (London, 1935), p.207.

[34]"The Present State of the Debate", par.3.

[35]*Ibidem*.

[36]*Ibidem*.

[37]For his views on complexity see "The Theory of Complex Phenomena" in (Hayek 1967, pp.22–42).

[38]Hayek (1945, p.519).

[39]Hayek (1945, pp.519-520).

[40]Hayek (1945, p.521).

we might call *practical* knowledge. This kind of knowledge cannot be integrated into the central data-base.[41]

Hayek's contribution to the analysis of planning is very significant. If we translate his argument using our terminology, then Hayek claims that the planner needs more than algorithmic knowledge. Practical knowledge cannot be expressed in the form of an algorithm, but human action is impossible without it. The planner is however unable to centralize practical knowledge.[42]

Now, suppose – going against what Hayek says about the triviality of the logical solution – that we prove that central planning is impossible because of some feature of algorithmic knowledge. Anyone who would try to defend central planning would have to show that somehow non-algorithmic knowledge is available to the planner and solves his problem. But here he would have to face Hayek's argument. Central planning would be impossible in the strong sense of the word, not just *practically* impossible

8.2.3 Philosophical Intermezzo: Popper's Rejection of Planning

Karl Popper formulated an argument against central planning that looks like Hayek's argument. Popper says that it is easy to centralize power, but it is impossible to centralize knowledge.[43]

If we go beyond the surface of the text, it is very difficult to follow Hayek. It does not make any sense in the context of Popper's philosophy to appeal to practical knowledge. Thus the argument seems to be similar to the one in Hayek, but must be different.

For Popper knowledge is always fallible. Popper has an antiauthoritarian philosophy of science. There are no experts, no authorities in science.[44]

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[41] Hayek (1945, p.524).

[42] (Barnett 1998) uses Hayek's approach for building an ambitious theory of liberty as structured by rules needed to handle problems of knowledge, interest and power. Barnett distinguishes between two kinds of knowledge: personal knowledge and local knowledge (see Barnett 1998, pp.31–35). The second type of knowledge is public, but it is practically dispersed "because it is costly to gain access to such knowledge"(Barnett 1998, p.35).

[43] "The holistic planner overlooks the fact that it is easy to centralize power but impossible to centralize all that knowledge which is distributed over many individual minds, and whose centralization would be necessary for the wise wielding of centralized power"(Popper 1957, pp.89–90). Popper adds than a footnote in which he mentions Hayek as the source of this idea.

[44] With admirable clarity Popper explained, in 1993, his antiauthoritarian philosophy:

> I do not regard myself as an expert in either science or philosophy. . . .

If we extend the argument, it becomes clear that the planners cannot be authorities or experts. Their very way of treating knowledge is incompatible with Popper's approach. Fallibility and openness to criticism of any solution to a problem is crucial for Popper.

At this point it might seem that Popper's philosophy is however compatible with the Lange-Lerner model of planning. The planners use trial-and-error, a method that looks similar to the scientific method, as Popper understands it. Again, this is an illusion. The model is not compatible with Popperian philosophy. Popper argues that between problem-solving in science and problem-solving in society there is a major difference. It is not possible to learn from very big *social* mistakes. The Lange-Lerner model proposes holistic experiments, because the planning itself is holistic.[45]

Popper offered, in contrast with holistic social experiments, his own version of planning that he called "piecemeal engineering". We prefer to use the term "piecemeal planning"[46] for two reasons. First, the kind of en-

> Today it has become fashionable in the sciences to appeal to specialized knowledge and authority of the experts, and fashionable in philosophy to denigrate science and rationality. Oftentimes, this denigration of science and rationality is due to a mistaken *theory* of science and rationality - a theory which speaks of science and rationality in terms of specialization, experts and authority.
> ... scientific knowledge is, despite its fallibility, one of the greatest achievements of human rationality... we can, through the free use of our always fallible reason, nonetheless understand something about the world and, perhaps, even change it for the better.
>
> Karl Popper, *The Myth of the Framework*, edited by M.A.Notturno (London: Routledge, 1994), pp.ix-x.

It is easy to note that this is far from the criticism of the use of reason that we find in Hayek. The whole book reveals the incompatibility between Popper's arguments and arguments that rely on practical knowledge.

[45]We may turn again to *The Poverty of Historicism*:"it is difficult enough to be critical of our own mistakes, but it must be nearly impossible for us to persist in a critical attitude toward those of our actions which involve the lives of many men. To put it differently, it is very hard to learn from very big mistakes. The reasons for this are twofold; they are technical as well as moral. Since so much is done at a time, it is impossible to say which particular measure is responsible for any of the results; or rather, if we do attribute a certain result to a certain measure, then we can do so only on the basis of some theoretical knowledge gained previously, and not from the holistic experiment in question. This experiment does not help us to attribute particular results to particular measures; all we can do is to attribute the 'whole result' to it; and whatever this may mean, it is certainly difficult to assess"(Popper 1957, pp.88-89).

[46]Rothbard used the term "piecemeal planning" and, of course, rejected this kind of planning. See his (Rothbard 1960, p.664). Rothbard notes that this is a pragmatic plan-

gineering Popper is talking about entails planning and this is not a problem in itself. Complex human actions are planned; they are not series of disjoint choices. The plans are fallible. There are breakpoints, reevaluations, backtracking; but a complex action is not a collection of random actions. Second, this is another type of planning. It is not individual planning. It resembles the planning of the whole society, but it is applied in solving specific problems.[47]

Taken separately, Popper's piecemeal planning can be interpreted as the philosophy of a new social-democracy, a social-democracy that has abandoned its old tenets and does not try anymore to change the whole society according to utopian blueprints. This interpretation is not pure speculation. It has been actually offered both by people who are social-democrats and critics of social-democracy.[48]

Inside Popper's philosophy, piecemeal planning does not fit very well with the vigorous anti-authoritarian theory of knowledge that Popper has offered to us. It seems that there is a tension between the surface structures of Popper's texts and the deep structures. Thus a libertarian reading of Pop-

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ning, "muddled government interventionism". He associates this approach the New Deal and his democratic collectivists supporters from the school of old institutionalism.

[47]Popper formulated the idea of piecemeal planning as follows: "This method can be used, more particularly, in order to search for, and fight against, the greatest and most urgent evils of society, rather than to seek, and to fight for, some ultimate good (as holists are inclined to do). But a systematic fight against definite wrongs, against concrete forms of injustice or exploitation, and avoidable suffering such as poverty or unemployment, is a very different thing from the attempt to realize a distant ideal blueprint of society. Success or failure is more easily appraised, and there is no inherent reason why this method should lead to an accumulation of power, and to the suppression of criticism"(Popper 1957, p.91–92).

[48]German social-democrats tried to find in Popper's philosophy, critical rationalism, a substitute for the ideology abandoned in the 1950s, Marxism. See G. Luehrs et al. (editors), *Kritischer Rationalismus und Sozialdemokratie* [Popper's Philosophy and Social-Democracy], I and II (Berlin and Bonn-Bad Godesburg, 1975, 1976). Gerard Radnitzky "Die Wissenschaftstheorie des kritischen Rationalismus un das Argument zugunsten der Freiheit"[Popper's Philosophy of Science and the Argument for Liberty], in Aleksandrowicz, D. and Ru, H. (editors),*Realismus? Disziplin? Interdisziplinarität* (Amsterdam/ Atlanta, GA: Rodopi, 2001), pp. 260–275 offers both the reasons for the social-democratic interpretation of Popper and an essay to build an alternative view, favorable to liberty, on the basis of Popper's critical rationalism. Roy Childs, Jr. "Karl Popper's *The Open Society and its Enemies: a Critique*, *Libertarian Review* 5, no.5 (September-October 1976), reprinted in *Political Notes*, no. 83 (1993) admitted that Popper's *Open Society* is "undeniably a classic", but claims that it represents "little more than a defense of social-democracy". Childs rejected the piecemeal planning and argued that it is precisely this type of planning that lead to the disappearance of free markets.

per is also possible.[49] This is not surprising. As all the great philosophies, the philosophy of Karl Popper is complex and leaves room for various readings. It makes no sense to look in it for a tract in favor of a political movement.

8.2.4 Another Interlude: Philosophy in Economics

The debate on planning, after World War II, disappeared as a dispute between different approaches or schools. It was no more a *pro and contra* planning discussion. It was more a question of interpretation of the results of the pre-war debate or an internal affair of different schools in economics.

For the present book the assessment of the philosophical aspects of the arguments against planning is of crucial importance. Don Lavoie wrote an stimulating book about many of the philosophical aspects that are significant from the point of view of an economist interested in the planning debate.[50]

Lavoie – one might say with Popperian dislike for arguments about words – says from the beginning that planning has many names: reindustrialization, national foresight capability, industrial policy.[51] Any of these names corresponds to a distinctive principle of the coordination of actions in society.[52] Lavoie adopts the rather common view that there are three such principles of coordination: tradition, planning, and market.

A first difference with the present approach should now be noted. For Lavoie, the whole problem of planning is at a *national* level. The problem is the coordination of the national economy. This book takes a different path. From "piecemeal planning" we take the "piecemeal" part seriously. Of course, it is rather difficult to indicate precisely what this word means. But this is not an argument about words. Planning is discussed not at the level of the society as a whole or at the level of the national economy, but at the level of a web of interactions that has – for the planner! – a problem that must be solved.

[49] Jeremy Shearmur, in "Popper, Hayek, and Classical Liberalism", *The Freeman* 39, no.2 (February 1989), argued that businessmen are much more prone to recognize their mistakes than politicians. Thus the environment that functions according to Popper's standards is the free market, not the government. Piecemeal planning does not fit into Popper's logic of discovery. Jan Clifford Lester, in "Popper's Epistemology versus Popper's Politics: A Libertarian Viewpoint", *Philosophical Notes*, no.34 (1995),also argues that "full anarchistic libertarianism (individual liberty and the free market without any state interference) better fits Popper's epistemology.

[50] Lavoie (1985).

[51] Lavoie (1985, 1).

[52] Lavoie (1985, especially p.30).

An example might help. Popper himself suggested that *poverty* is such a problem that has to be solved (by planners). Of course, it is a problem from the point of view of the planner, because otherwise things might be different. Think about a community of monks who want to live in poverty. It would be ridiculous to wage a war on poverty in this case. But any "war on poverty" is bound to start a very complex series of interactions. I am not tempted to think like a holist, but if I did, then I would claim that the whole society is affected by this war. However, all the web of interactions is generated by the attempt to solve in a certain way a problem.[53]

For Lavoie the problem of planning is a *knowledge problem.* This shifts the focus in the direction of that part of the Austrian school which claimed that there are strong analogies between scientific research and economic entrepreneurship.Lavoie introduces an interesting quotation from Lachmann, that deserves to be reproduced here:

> The businessman who forms an expectation is doing precisely what a scientist does when he formulates a working hypothesis. Both, business expectation and scientific hypothesis serve the same purpose; both reflect an attempt at cognition and orientation in an imperfectly known world, both embody imperfect knowledge to be tested and improved by later experience.[54]

The idea fits nicely into what we have called the choice-points model. Any agent who plans an action at a given point has to work with a reflection at that point of other points. What I would like to add is that the hypothesis is not enough. It was Popper's basic intuition that the researcher also needs logic for deducing from the hypotheses consequences. Like the researcher, all agents also use logic and results that have an apriori character. A plan is rational because it takes into account whatever might be established on logical or mathematical grounds. Of course, it is more than this, as Lachmann points out, and from that point of view it is fallible as any other conjecture.

[53] It is curious that Popper, who is questioning in other contexts the assumptions of a problem, does not insist that we should do the same in the case of "social" problems. In a famous passage, Popper wrote: "if we approach political theory from a different angle, then we find that far from solving any fundamental problems, we have merely skipped over them, by assuming that the question 'Who should rule' is fundamental."(Popper 1945, vol.1, pp.120–121). Popper then goes on and shows that the real question is "How can we organize political institutions that bad or incompetent rulers can be prevented from doing too much damage?"(Popper 1945, vol.1, p.121). This is, I think, another example of the tension between the surface of the philosophical text and its underlying logic.

[54] Ludwig Lachmann, *Capital and Its Structure* (Kansas: Sheed, Andrews and McMeal, 1978), p.23, apud (Lavoie 1985, p.51).

Lavoie argues that the argument that dispersed knowledge prevents the planner from building a relevant data-base can be applied beyond *comprehensive* planning. He makes a distinction between knowledge and data. From this perspective, all the planners can get are data and this affects both comprehensive and noncomprehensive planning.[55]

As Hayek, Lavoie has a strong concept of knowledge. He insists especially on what is called *tacit* knowledge.[56] He even goes as far as to play down the contrast between Popper and Kuhn. This helps him however to bring Popper closer to Hayek and his argument against planning.

In contrast with Lavoie's strong concept of knowledge, we prefer to focus on a weak concept of knowledge: algorithms for data processing. The idea is to go into the ultimate sanctuary of social planners and show that the hope to find one day an algorithm to solve their problems is misplaced. Once we have a firm ground for the impossibility of some kinds of planning, we may backtrack and find out what kind of planning is possible and in what institutional setting.

Another distinctive trait of the present approach is the different use of the results of Gödel, Church and Turing. Lavoie mentions Gödel and interprets his results as a proof that the human mind can do more than any kind of formal system.[57] We take a road that starts we Church and Turing and focus on the limits of computability itself. This choice is, of course, dictated by our option for a weak concept of knowledge. Lavoie uses the famous results in logic that have their roots in Gödel's work for his argument that there is more than weak knowledge.[58]

8.2.5 Austrians versus Market Socialists

Mises's answer to market socialism was that institutions do matter. We see this already in his book *Socialism*, in his analysis of artificial markets.[59] He came back to this idea later, in a text published in 1962, and showed that private property plays a key role.[60]

What was the reply to this objection of the market socialists? Lange was not very troubled by the problem of private property. Lange noted that

[55] Lavoie (1985, p.57).

[56] See especially the appendix on tacit knowledge and the revolution in the philosophy of scienceLavoie (1985, pp.247–265).

[57] Lavoie (1985, p.253).

[58] Lavoie (1985, pp.253–254).

[59] (Mises 1981, pp.119–123).

[60] (Mises 1991). It creates spheres that are free of government intervention. These are the spheres without which the concept of profitability would make no sense.

"it is most surprising to find this institutionalist view supported by a prominent member of the Austrian school, which did so much to emphasize the universal validity of the fundamental principles of economics theory"[61]. He even suggested that there is a deep contradiction in the Misesian theory between the claim of universal validity and the role of institutions.

If we go back to Mises, we discover that his argument was more subtle. It had nothing to do with the old institutionalism. Mises argued that in Lange's model there is a presupposition that only the producers themselves affect the market for factors of production. The relation between capitalists who supply capital and entrepreneurs who are looking for capital is completely obliterated.[62]

The socialists did never recognize that this was the final blow to the attempt to save something from the classical socialist ideal. Their actions proved however something different. The very notion of socialism in the strict sense of the term had to be abandoned. Lerner, for example, a prominent figure in the debate, changed his mind and did not adhere later to the idea of giving-up private property. One might say that all that remained was piecemeal planning done by all kinds of governmental agencies.[63]

8.2.6 Two Types of Assessments of the Classical Debate on Planning

In the West, most of the intellectuals ignored Mises and turned (slowly) toward piecemeal planning. In the East, (old style) national economic planning was abandoned only after 1989.

There were few books or textbooks sensitive to Austrian arguments against planning. A most notable exception is Hoff's book. The Norwegian economist argued that socialism is possible, but inefficient[64]. A socialist society can exist, at least for a time; but lacks the very structures that enable the evaluation of efficiency. He presented a complex and fair picture of the debate on planning.

The other view on the debate came from authors like Abram Bergson.[65]

[61] Lange (1936, p.55).

[62] Mises (1981, p.121).

[63] In his book *The Economics of Control* (New York: MacMillan, 1944) Abba P. Lerner explicitly states that "control does not necessarily mean collectivism"(p.viii). He is interested in the principles of welfare economics that apply primarily to a society in which private property has not been abolished.

[64] Hoff (1949, p.295).

[65] In an essay for the *Survey of Contemporary Economics* (1948) he summarized the opinion of the majority of economists on socialism. For details see Karen Vaughn's intro-

In 1948, he said that Mises' argument is without much force in the opinion of the majority of the economists.[66]

8.3 The Austrian Internal Debate

Inside the Austrian school of economics there is a dispute between those who want to contrast the arguments of Mises and Hayek and those who argue that they are complementary.

What is the problem? Of course, the two arguments against planning are quite different. It is very easy to see that they are formulated differently, that they use different concepts and start from different premises. They even reach different conclusions: for Mises socialist planning is logically impossible; for Hayek socialist planning is practically impossible and leads to the destruction of the rule of law.[67] The problem is the nature of the *presuppositions* of the two arguments.

In 1991, Murray Rothbard published an article in which he reviewed the main arguments of the classical debate on planning. He started by mentioning that until Mises everyone knew that socialism had an incentive problem; Mises challenged however in a much more subtle way socialism by pointing to the calculation problem.[68] Rothbard criticized the Lange-Lerner model and then focused on Mises's rebuttal of Lange and the role of the entrepreneur in the vision of Mises. This prepared the stage for an attack on what Rothbard called "the fallacies of Hayek and Kirzner"[69] He suggests that Hayek abandoned the term "impossible", because it was too

duction to (Hoff 1949, p.xxxiii).

[66]The debate on market socialism is far from being closed. Hanousek and K.Filer (2002, p.491) write about "one of the key issues in an almost forgotten, but once famous, controversy in the economic theory of socialism: whether a socialist economy... could allocate its resources to replicate a perfectly competitive outcome". They use "the artificial bidding market that occurred as part of Czech voucher privatization to test" this conjecture(Hanousek and K.Filer 2002, p.497). The test corroborates Hayek's contention that the planners cannot get the right prices. The *key issue* is not however forgotten. See Zappia (1999) for a review of the literature of the new market socialism, after 1989. Among the authors there are the names of Roemer, Bowles and Gintis. See P.K.Bardhan and J.E.Roemer(eds.), *Market Socialism: the Current Debate* (New York: Oxford University Press, 1993). According to them, in a coupon-market, traders should exchange only shares for shares, not for money (apud Zappia 1999, p.15). We follow, in this book, the opposite insight of Misesian origin, according to which money plays a key role in a complex network of agents.

[67]The political consequences of planning are analyzed in Hayek (1986).

[68]Rothbard (1991, p.51).

[69]Rothbard (1991, p.65).

extreme.[70]

The most important point that Rothbard makes, from the point of view of this book as a whole, is that Lange claimed in 1965, before his death, that the computer could solve the planning problem. It would be no problem to solve all the equations involved.[71] Rothbard rejected this attitude as naive.

After Rothbard, Joseph T. Salerno stated the same position in very strong terms. Joseph T. Salerno uses Thomas Kuhn's term 'paradigm' for the Misesian and Hayekian approaches.[72] But it is rather difficult to see what warrants such a sharp distinction. Salerno mentions, of course, the well-known strictly aprioristic perspective of Mises.[73] He insists that for Mises the market is coordinated by prices, while Hayek stresses the role of knowledge.[74]

Salerno delineates a much sharper distinction when he contrasts the idea of rational order in Mises with the Hayekian notion of spontaneous order.[75]

Leland Yeager rejects the two-paradigm view. He appeals to "a principle of textual interpretation"[76], rather than to actual words in the text. He argues that the contrast between calculation and knowledge is untenable.

According to Yeager, economic calculation steps in when we have to choose between alternative uses of the same resource. The resource might be, for example, a piece of land. The owner has to decide what to cultivate on it. She has to make not only a pure technological calculation. For the economic calculation, prices are the summaries she needs.[77] Yeager also pointed out in his article toward the problem of complexity: the world is too complex to be treated like a single farm.[78] His conclusion is that it is impossible to be concerned only with calculation and ignore knowledge while trying to analyze the planning problem.

Salerno quickly challenged Yeager's position and claimed that Yeager reduces calculation to trivial arithmetic. Based on the well-known concept of appraisement from Mises, Salerno argued that calculation is a problem of appraisement, not arithmetic.[79]

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[70] Rothbard (1991, p.66).
[71] Rothbard (1991, p.71).
[72] See Salerno (1993, p.115).
[73] Salerno (1993, p.125).
[74] Salerno (1993, p.126).
[75] Salerno (1990, p.27).
[76] Yeager (1994, p.94).
[77] See Yeager (1994, p.95–98).
[78] Yeager (1994, p.100).
[79] Salerno (1994, p.111–112).

Yeager rejected Salerno's views again in 1996. He articulated the following argument: there is non-discursive, tacit, practical knowledge that can be acquired only on the market by an entrepreneur. Socialism cannot replicate this process.[80] This is an argument in the tradition of Hayek. What Yeager added specifically was that calculation and knowledge cannot be separated.

This internal debate in the Austrian school is very instructive. First, I would emphasize that this is not the kind of debate I would like to join. The participants are engaged in a hermeneutics of classical texts. However, one can add some comments from the outside.

First, one wonders what is at stake in this dispute. A good conjecture is that Hayek, by admitting that socialist planning was not logically impossible, weakened the Austrian side and created the impression that its arguments are weak.[81] I think that Hayek was wrong and there is at least some form of logically impossible planning. But this does not entail that he has another "paradigm".

The dispute is also an illustration of what happens when the researchers do not use mathematics or at least some kind of logical model. In this debate it was obvious that, when the conceptual network is complex, it is very difficult to understand what somebody tries to say. Faced with such difficulties, the participants seem to repeat forever some interpretation of a classical text.

This does not mean that they do not have interesting insights or that what they say is unimportant. In the following section of this chapter we return to an abstract analysis of the planner model.

8.4 Limits of Planning as Limits of Computability

In this section, we discuss the limit case represented by interactions that are totally planned.

Two remarks are important here. First, the planner model that we discuss is a moneyless model. Second, the argument is formulated as an imaginary experiment in which we use a minimal set of concepts, as it has been explained in the first part of the book.

[80] Yeager (1996, p.138).

[81] Keizer (1987, p.110) makes this observation before the start of the debate that we have presented above. Keizer's article also contains a lot of information beyond the seemingly narrow scope suggested by its title.

It should also be added that we are in no way interested in problems of efficiency. From this point of view, the set of concepts is even more restricted than the set analyzed in the first part.

In order to make the argument more vivid, we may imagine that - as in Orwell's *1984*[82] - there are special screens everywhere. Screens can read your mind. You can talk to the screen and you receive orders from the screen in a version of Newspeak that uses only numbers. Each number represents a code. Orders are sequences of Newspeak codes and contain all the algorithmic knowledge that is necessary for taking part in an interaction.

You may receive the order to marry a certain person. Or you may be told that you have to cut a bit shorter your hair. You will also receive orders on what you have to read and so on.

There is however a difference between Orwell's novel and our tale. In our version of the story, Big Brother is a universal plan, not a human being or a myth of the Party. Big Brother is the universal plan to make everybody as happy as possible. The plan is stored on a central machine and the machine is connected to every screen.

8.4.1 The Closed Web of Interactions

Let's make now the description a bit more technical. The basic idea is that nobody can, in the hypothetical situation, escape from the plan. We will formulate it in terms of interactions.

Any new interaction is part of the already existing system of interactions. There is no possibility of "emigration". It is not possible to be like a glider in the game "life". There is no system of interactions that is going to separate itself from the rest.

A consequence of the above condition is that the plan is universal in a strong sense. It is unique. There is no possibility to separate a portion of the system of interactions and put it under the guidance of another plan.

We also would like to stress that we are not talking about a "society". The comparison with "1984" is only metaphorical. A society contains many systems of interactions. The "1984" society, in a realistic version, has a black market. It also has its dissidents.

Our system of interactions is a limit case. It is an idealization made only for the sake of proving that the plan is logically impossible.

[82] George Orwell, *1984* (New York: New American Library, 1961). The novel was first published in 1949.

On the other hand, no individual is a disguised mechanical device. The individuals are strictly guided by a plan, but they are individuals. They perform actions. As we have said earlier, they speculate the accidental. Their interactions are real. And this is going to be crucial for the whole argument, because actions and interactions, in a real environment, have constantly to be adjusted.

The plan has to indicate how to perform new types of actions. The interactions have no cyclic pattern. Presumably, a sound universal plan should be able to cope with such a task. If this is not logically possible, the comprehensive universal plan is bound to fail.[83]

8.4.2 The Formal Structure of Planning

The idea behind the hypothetical plan is to concentrate all the algorithmic knowledge in the plan and then make it available for action. The plan is stored and processed in a Central Planning Unit.

The Central Planning Unit works with a data-base.[84] Let us suppose that for each phase of an interaction between the individuals, the unit keeps a long tape with squares on which there is a code. There is a certain convention for the reading of these tapes, but basically the idea is that sequences of codes correspond to instructions that are to be send to individuals.

Sending data to individuals is part of a series of peripheral processes that do not interest us here. We will concentrate ourselves upon what goes on in the Central Planning Unit itself.

[83] Solcan (1983) contained a very different formalism for the planning of actions. The formalism used Sneed models. These models have been proposed as a reconstruction of the non-statement view of scientific theories. The formalism for interactions was rather less developed. There was instead an idea of transition from a state of the system of individuals and actions to another state of the system. The paper showed that the existence of a universal political doctrine that would guide all these transitions is impossible. This was in the final part of the paper. The impossibility theorem exploited results in the theory of algorithms and it is easy to translate it into another one, in the context of a different formal reconstruction of the theory of action.
I should also add that the paper was the product of intellectual curiosity. It had no direct political connotations. But I had in mind Marxism and its claim to be a "guide in action". Marxists were aware of the problems that are raised by the necessity to adapt their doctrine to a changing world. However, they also claimed that the guidance for the adjustments is to be found in Marxism itself. I just wanted to see if this is logically possible in a coherent manner or it is just an empty slogan that covered the arbitrary decisions taken by the leaders.

[84] There is no Hayekian centralization problem here. There is no "friction", so to speak, in the transmission and the collection of data. Thus there is no dispersion of knowledge.

We suppose that individuals just receive orders and execute them faithfully. They have no idea where the complex process of actions is going to lead. It is like in a joke that I heard long ago: John works in a factory. He thinks that the factory produces bikes. He starts stealing various parts. Then he assembles them at home. To his amazement, he discovers that he has a machine-gun.

In the Central Planning Unit, there is a precise series of actions that can be executed with the paper tapes. The content of a square can be read and also it can be rewritten. After the examination of one square and its modification, another square is examined and there is a unique way of indicating which square is going to be processed next.

There are also lists with instructions for the processing of squares. These are called 'states' (of the process of planning). Basically such a state specifies for a given content of a square on a paper tape what is to be done in the following order: change in a certain way the content of the square, move to another square and go into another state.

There is a table that has on the rows states and on the columns contents of the squares (numerical codes). This is the program of the Central Planning Unit. The unit works according to this program, which is stored in the unit itself.[85]

Now one can clearly see that planning is a process. There is no static list from which individuals read what they have to do. There is an internal processing process. The table described above governs this. There are also various peripheral processes that connect the Central Planning Unit with the individuals who have to interact with one another. The individuals are completely guided by the central unit.

Let's go back to the Central Planning Unit and look again at the program of the unit. The program has the form of a table and, if we look carefully at the content of each cell of the table, we see that the content of the cell is an instruction for action. It is a very special kind of action, namely to modify the content of a square on a tape that contains the data that are processed by the Central Planning Unit. We can define a procedure for writing codes of these instructions. They are of the same type as other codes for actions. For any table of an unit like the Central Planning Unit

[85] Anyone who is familiar with the theory of algorithms can recognize at this point a concept called the "Turing machine". The Turing machine is not a real computer. It is the concept of computer itself. The original formulation of this notion can be found in Turing (1936), which is a technical paper, and Turing (1950), which is a philosophical paper. The importance of the use of such a general concept of computer is obvious, if we think at Oskar Lange's claim in 1965 that computers can solve the problem of planning. The planner is here an ideal computer. Its program is the plan.

we can write a sequence of codes. Let us call it, for short, key-code.

Now, the key-code can be stored on a paper tape. It is going to be processed like any other sequence of codes. The Central Planning Unit, in order to be really universal, has to do this. It cannot give the job of processing its key-code to another unit.

Let us now concentrate on the idea of processing a list. There is a starting-point and a point at which the process reaches a result. The result is also a list. It contains, for example, codes that can be read as instructions for the individuals who obey the plan. Let us call the list at the starting point starting-list. The result, the end-list, is obtained using processing-codes.

The processing power of the Central Planning Unit can be expressed in the following way: for any starting-list, there is moment of time at which, using its key-code, it produces an end-list. Or, to put it in simpler words, the Central Planning Unit is able to come with a list of instructions for actions, starting from any data input.

8.4.3 Changing the Plan

We supposed that the plan is universal. Presumably, it should be able to contain the plan to change the plan itself.

We must insist on the capacity of the plan to change itself. The plan is not some kind of revelation of the hidden workings of the history. It contains actions that seek to exploit various forms of accidents. Some of these accidents are rare, improbable if we take into account only the natural course of things, but they are brought about but human action. In such a context it is normal to adapt the actions and invent new actions. The plan cannot be an exception.

Let us now have a closer look at the nature of algorithmic knowledge. Suppose that we have a task to perform. For example, we have to find the sum of two numbers. In order to solve such a task we cannot just come with a result. We have to reach the result following certain steps in a procedure. The result must be also unique, even if we change somehow the steps. Algorithmic knowledge is the knowledge that is used in order to solve tasks in this way.

Now we may come back to the Central Planning Unit with a task. The unit has to modify a starting-list in the following conditions: if there is a moment in time at which the unit, using the starting-list as its key-code, reaches a result, then the task is to modify this result itself in some way; otherwise the task is simply to obtain as a result the starting-list itself, in

an unmodified form.

The Central Planning Unit cannot fulfill the task introduced above. There is nothing unusual about the task itself. It could be performed by some other processing unit, but not by the Central Planning Unit itself.

First, let us suppose that there is a unit that can solve the task given above for any input.

Second, let us substitute the input with the key-code of the unit itself. Since, it is the case that it can solve the task, then the result of fulfilling the task is a modified form of the result itself.[86] This is a contradiction and the task cannot be fulfilled in this case.

Therefore, what is true for any unit is true for the Central Planning Unit too. There are tasks which it cannot fulfill.[87]

The Central Planning Unit is not universal. There are tasks it cannot perform. We also supposed that the interaction system is closed. But the task that cannot be performed is to modify a certain form of the program of the Central Planning Unit itself! This is part of the system of interactions! Now we can draw the final conclusion. The Central Planning Unit is not able to perform a comprehensive planning activity.[88]

Therefore, the comprehensive planning of series of closed interactions is logically impossible.

8.4.4 The Theory, the Ideal, and the Praxis of Planning

The previous argument turns upside down the usual idea that planning is a nice ideal that is unfortunately practically impossible to reach. As an ideal, planning is logically impossible. However, one can try to implement what cannot be done in principle.(Popper 1989, pp.355–363) explains how the

[86] Only the "dialectic logic" of the Marxists might come with the fairly absurd idea that a result is both something and something else. I think everyone should read on the topic of dialectic Karl Popper, "What is Dialectic?" in (Popper 1989, pp.312–335).

[87] The theorem that we have used here is called "Church's theorem". Its technical proof using a Turing machine can be found in Stephen Cole Kleene, *Mathematical Logic* (New York: Wiley, 1967), pp.242–247. This book is a classical treatise in which there is also an excellent presentation of the famous results of Gödel. Here we have used Church's theorem because it is concerns computations and programs, i.e. plans for action.

[88] Wilfred Hodges and Dudley Stark have an admirably short formulation in their course on complexity and optimization in operational research: "there can't be an algorithm for solving all mathematical problems" <http://www.maths.qmul.ac.uk/~wilfred/coor/mycoorweb2.pdf>, p.73. Lange's computer does not exist in its ideal form. There is no mathematical solution for the planning problem, if we mean by "plan" an ideal, universal, unique plan. This is not a solution formulated from a practical point of view. This shows the existence of a logical limit of planning.

effort to implement what is logically impossible generates violence. This is what happened under communism. The great plans failed and the leaders looked for sinister subversive forces. They did not realize that the ideals themselves were the problem.

Let us review some potential comments on the argument of the logical impossibility of planning. The first one might be that a personalized authority should replace the impersonal planning authority. This authority would have absolute dictatorial powers.

But the limits of the computational process will affect automatically the human too. What could the dictator do? Refuse the nasty reflexive task that we forced the impersonal authority to consider? This means however that the dictator accepts his limits. He has no solution for every task. But, in this case, his computational abilities are not absolute.[89]

If the dictator still wants absolute powers, then he will promote an inconsistent plan. A very simple logical proof shows that from a system that is logically contradictory, one can infer anything.[90] If you can infer anything, then the dictator can behave in an arbitrary manner and issue contradictory orders.[91]

[89]Here there is a difference with the interpretation of the Gödel, Turing, Church results according to which these results would prove that the human mind has some mysterious supplementary powers. If it had, then the human dictator could, in principle, use them. Of course, the human dictator has intuitions, visions on which he would be able to base his choices. But, in this case, the questions is "why only his choices?" and "Does even this solution work?". Anyway, this means that the precise, algorithmically organized, universal, unique, comprehensive plan does not work.

[90]This holds for classical logical systems; paraconsistent logics are different. My interpretation would be however that paraconsistent logic is a logic of the dialog. In a dialog or conversation it is normal to have different or even contradictory opinions. But our dictator has absolute power and we suppose that he listens to nobody.

[91]George Orwell, with the art of the novelist, shows how absolute power uses contradictory statements. When Winston Smith is arrested and questioned, he learns how important is for absolute power to play with contradictions:

> 'Do you remember,' he went on, ' writing in your diary, "Freedom is the freedom to say that two plus two make four"?'
>
> 'Yes,' said Winston.
>
> O'Brien held up his left hand, its back towards Winston, with the thumb hidden and the four fingers extended.
>
> 'How many fingers am I holding up, Winston?
>
> 'Four.'
>
> 'And if the party says that it is not four but five – then how many?'
>
> 'Four.' ...
>
> 'You are a slow learner, Winston,' said O'Brien gently.
>
> 'How can I help it?' he blubbered. 'How can I help seeing what is in front of my eyes? Two and two are four.

Absolute power combined with a universal plan generates absolute arbitrary power.[92]

Maybe the absolute dictator still could be benevolent in some way? What if he tries to help people to be happy? The problem is the lack of criteria. This is precisely what is shown by the proof that planning is logically impossible.

There might be however a criterion. This is the criterion of liberty. But this criterion is out of question for an absolute dictator. It is reflexive and would simply melt absolute power.

There is a legend about laissez-faire that illustrates the point that we made above. A powerful minister summons a number of businessmen to the court. He wants to know how could he help the businessmen. The answer comes promptly: *laissez-nous faire*. Let us take care! Obviously, no minister likes this answer.

8.4.5 Beyond the Universal Plan

If a web of closed interactions is sufficiently complex, then one can prove that no universal planning works. This is a logical impossibility, not just a practical impossibility.

The reasonable planner would engage in a rollback process. He would point out that he is engaging in planning in world in which many open webs of interactions coexist and he has no comprehensive plan.

> Sometimes, Winston. Sometimes they are five. Sometimes they are three. Sometimes they are all of them at once. You must try harder. It is not easy to become sane.'
>
> George Orwell, *1984*, ch.3.

[92] This explains the disappearance of 'tends' in the second part of "Power tends to corrupt and absolute power corrupts absolutely"(Acton 1985, vol.3, p.519). This maxim is extracted from a letter of Lord Acton and is usually quoted without mentioning the context in which Lord Acton makes this remark. Lord Acton is rejecting the idea that historians should judge Pope and King with a favorable presumption. "If there is any presumption it is the other way against holders of power, increasing as the power increases. Historic responsibility has to make up for the want of legal responsibility"(Lord Acton, *Essays on Freedom and Power*, selected by Gertrude Himmelfarb [New York: Meridian Books, 1957], p.335). Then comes the well-known maxim, as it is reproduced in the *Selected Writings*, in the context of other maxims on power. The key of the whole context is the "*increasing as the power increases*". What we proved in an abstract manner is that if power increases to the maximum, then it can have solutions to everything, but according to an inconsistent plan, which is implemented according to the choices of who happens to hold the power. It would be absurd to transform this into an ideal toward which every social effort should be oriented.

A major step in the rollback process is the abandonment of universality. Popperian criticism of utopianism is also an excellent argument against *universal* plans, plans based on some ideal of a great reorganization of society.

What remains for the planner? Piecemeal planning is the only alternative that is really open for the planner. It is not a logical impossibility. It also deserves careful analysis.

Despite the context of this book, a book focused mainly on the formal analysis of action, we should emphasize that as we go farther and farther away from the central logical core of the theory of human action, experimental economics steps in. The fact that we concentrate so much of our attention on the core should not be interpreted as an agreement with a purely logical methodology.[93]

Does piecemeal planning escape logical scrutiny? No, not at all. But it is at the limit of the area that is covered by purely logic analysis.

Is there another way of extending the choice-points model than the planner model, the model with a planner that coordinates various plans for action? Before answering this question our first move is to reject the very notion of coordinating the plans. If this notion makes sense, then it makes sense to build a more encompassing plan that takes advantage of the results of the coordination and so on. We end up again with some universal plan; but this is impossible. Thus it does not make sense to talk about coordination.

The extension that we contemplate is that of a model with monetary prices. We have shown that monetary prices did play a key role in the classical debate about planning. Introducing them is part of a demonstration that complex system of interactions function without a planner. It is also a way of vindicating Mises: we show that any kind of planning destroys monetary prices and destroys the fine tissue of human relations.

How far goes the rollback of planning from the point of view of the formal theory of action? Who *can* make unique plans? The idea is to show that the only arrangement that makes sense is one in which individuals make plans. They are the only planner within the limits of their property. This is precisely the meaning of property: to let the others know who may plan what.

All these arguments are surrounded by deep philosophical disagreements on their presuppositions and their significance. We try to convey a

[93] One should note however that the core has a *logical* character. No empirical experience can lead us to its abandonment. But layers of theory that are more and more under empirical pressure surround it.

feeling of these disagreements with the help of the imaginary dialog that follows.

8.5 The Planner and the Libertarian

Let us imagine that the Planner and the Libertarian are engaged in a direct debate.

Planner: The argument that planning is logically impossible does not convince me. It looks more like a trick than a serious argument.

Libertarian: I am not trying to convert you or anyone else. I was just curious. But I find the argument persuasive.

Planner: The task that you want to be solved by the planning process seems very artificial.

Libertarian: Why? It just says that if you are able to revise the plan itself, then you should return the modified plan plus some supplement. For example, the people should say "Long live the plan!" If the plan cannot revise itself, then it should just return the plan itself as a result.

Planner: All this sounds so artificial. After all, what does it prove?

Libertarian: It proves that the planning process has limits from a pure computational point of view.

Planner: Individuals also have all kinds of limits. It is even much more easy to point to these limits.

Libertarian: I am not the advocate of direct individualism. Individuals have cognitive limits. The argument in favor of individualism is indirect. I am not starting from selfownership and then try to extend the sphere that is under the sovereign control of the individual. I am starting from the logical impossibility of a universal plan. This leads to the conclusion that there is a diversity of plans for action. Then I try to show that we stop logically at the level of the individual. It is only the individual that makes plans that really work.

Planner: These impossibility results are well known from the theory of algorithms. Everybody heard all those stories about logical systems that have means to prove so strong that they are incomplete and about the fact that no machine can compute every function.

Libertarian: The point is that the plan cannot be universal. It cannot evaluate all the tasks that could be performed in the given system of interactions and take a decision concerning the respective task.

Planner: I agree that human judgment should be added to the process of planning. Then computation limits are no more a threat.

Libertarian: Whose judgment?

Planner: Well, we need a committee of experts!

Libertarian: But the members of the committee lack criteria for a decision in any case. They will just use their tastes as criteria.

Planner: Well, I might agree that planning should not be universal. But we need some restrictions and regulations to be applied. I think you agree that this is a reasonable position.

Libertarian: No, I do not agree. First, which are the limits of the power of the planning committee?

Planner: Maybe, there should be more such planning committees. They may leave a lot of space for free action and just will regulate excessive actions. Extremists in different areas should be limited.

Libertarian: No, I do not understand what you want to say. Now, it is my turn to ask you to be more specific. Give me an example of tasks for such a committee.

Planner: I will be more specific. I will give you an example on your favorite ground. I think that you are especially in favor of the freedom of speech.

Libertarian: I would rather say that liberty of action is crucial. But let us see your example.

Planner: Well, we both agree that free speech is important.

Libertarian: Without it even your fellow planners would not be able to formulate their plans in a rational way.

Planner: It is not this that I had in mind. I was thinking that television would be a good example. There should be ample freedom for broadcasting, but a wise committee must trace the framework within which such freedom should exert itself. For example, the committee sets the percentages of commercials that are acceptable. It is also the job of the committee to assign a certain broadcasting time for good music. Even the language should be a bit planned.

Libertarian: I see the same problem: lack of criteria. All the process is arbitrary.

Planner: Don't you think that children should not be exposed to explicit sexual scenes on television? We should plan the way in which they are broadcasting movies. At least the hours for broadcasting should be planned.

Libertarian: I saw on TV a scene in which a lion and a lioness made love. It was rather explicit.

Planner: No, no. Let's discuss seriously. I thought that this is an academic discussion.

Libertarian: I see the point here. It is easy to make a difference be-

tween an animal and a human being. But I still think that one lacks general criteria. Just think a bit about this limit on sex. So, you cannot use in a move or a commercial message a woman and a man who make love. But I saw many commercials that use wordplay: the same word may have sexual and non-sexual connotations. They exploit this possibility.

Planner: It is not explicit sex.

Libertarian: Of course not. But this is not the problem. Presumably, you forbid explicit sexual contact because it arouses the beast in us. The same effect can be obtained indirectly. It is even more efficient. It is the human way of doing this. And there is no way in which you can find a criterion for what should and what should not be done. The committee is just using the tastes of its members.

Planner: No, this is absolutely false. The committee takes into account public opinion. I think that such committees should be democratically elected.

Libertarian: This does not solve the problem. The taste of the majority will dictate. Why not let everyone be free to choose?

Planner: Well, I will make another attempt to convince you that something must be done. There are problems in which some kind of intervention is necessary. Let us not talk about planning. I hope you will accept the idea of intervention.

Libertarian: Intervention is just another word piecemeal planning. I do not think that we should analyze words. Anyway, where is this kind of piecemeal planning going to take place?

Planner: Look, children have to learn! Handbooks for children should not be expensive. This is an example of a nice intervention. Let us set a ceiling-price for each type of handbook.

Libertarian: In this case, I find the distinction between closed and open interactions very useful. If you want to keep the interaction open, you will end up with authors that are losing the interest for writing handbooks. Writing the handbook will not be that attractive. They will try something else. They will step out of the respective web of interactions and look for something else.

Planner: We will set up standards for the handbooks.

Libertarian: So you want to keep the interaction closed. Then you have to take care of all the aspects of handbook writing. I don't think standards are enough. Anyway, you have to organize a committee that has to find out if the standards are observed. Again the process cannot be fully planned and you will end up with ...

Planner: Members of the committee have to use their judgment.

Libertarian: Why not let everybody use her own judgment. If there is liberty, there will be expensive and cheap handbooks. All kind of authors will try to write handbooks.

Planner: But you did admit that individuals have limited cognitive capacities. It is very difficult to choose when so many handbooks are around. Somebody has to tell people what to do.

Libertarian: We are moving now in a circle. I do not think that we reach any conclusion.

Planner: If the fate of the young does not move you, maybe you will find some compassion in you for old people. You are not that young anymore. Old people have low incomes. Wouldn't be fair to offer them the possibility to buy from stores that have lower prices?

Libertarian: I do not think that you help anybody in this way. A free market is a better solution. On a free market you will find all kinds of prices.

Planner: In a certain sense you might be right. But monopolies keep prices high. We should break them. We should plan for diversity. I think that you will agree at least with this idea that we should plan for diversity.

Libertarian: I find it absurd. How can one determine how diversity should look like? The liberty to entry or leave a market is enough.

Planner: Our discussion seems to reach a deadlock. But I do have an argument in favor of some form of planning. People want to know what will happen with them. Planning might not be exactly the best solution. But we offer them a nice illusion.

Libertarian: This time I agree with you. Minds are tempted by illusions. Collective plans offer precisely the illusion that you know already how will be the world in the next years.

Planner: The indirect character of your arguments and their intricate character prevent them from getting into the minds of people. Ironically, it seems that I have an indirect argument for planning too. Since it is so difficult to accept the institutions of absolute liberty, then piecemeal planning makes a lot of sense.

Libertarian: The problem is that through planning you create a perverse incentive structure. I might try some other time to explain you how incentive structures work. For the moment, I think that we should stop.

Chapter 9

Minds, Brains, and Computer Models

There are some interesting similarities between the debate on planning in economics and debates in cognitive science. The similar alternative between a centralized and a decentralized model challenges researchers in cognitive science and in economics. This does not mean that what is good for one field is also good for the other.[1] Our interest is focused on the formal structure of the models and the nature of the arguments in the two fields of research.

The solution in the case of human interactions seems much closer to us than in the cognitive sciences. If we stick to a formal approach to human interactions, then we are not getting involved in the formidable problem of the nature of human consciousness. We keep a low profile and use what we have called 'algorithmic knowledge'. In contrast, cognitive science is confronted with problems that remain, for the moment, hard and mysterious.

We build, using elements that have their origin in cognitive science, a model for human interactions in which there is no Central Planning Authority of any kind. While the model that we used in the chapter on the impossibility of universal planning stressed the elements that were necessary for a negative result, this model has to point in a different direction.

We use the basic idea from Mises's proof against planning as the key-idea of the model. This idea is that calculation and the possibility to calculate is of paramount importance.

[1] A bold but not implausible conjecture is that the order between adequate and inadequate models is reversed in the two domains.

The model, on the other hand, should not be read as an interpretation of the argument developed by Mises in *Human Action*. The model uses a rather different approach to price. It also tries to be strictly formal. It has no use for aims of the actions or for mental contents.

9.1 The Classical Model of Cognition

All the discussions about models of human action have striking similarities with the debates around models of human cognition. This does not mean at all that the same model should be adopted in both cases. The point is that the formal structures of these models can be used in both cases and that at least some of the disputes have interesting parallels in the other domain.

There are at least a dozen ways of characterizing computation.[2] We shall adopt a somewhat restrictive approach (from the point of view of the cognitive sciences) because we are interested in the formal pattern followed by the process that we call computation. Let $f(list-of-arguments)$ be a function. The name of the function is f.

The idea of the classical model is simple: the $list-of-arguments$ is the input, the result (of the computation) is the output. In order to carry out the computation we need a central processing unit (CPU) and a memory. We put the input in the memory. We also put in the memory a $list-of-instructions$. The CPU uses the $list-of-instructions$ in order to process the input. There might be a series of intermediary stages of the computation process. At each stage the results are stored in the memory. The final result is the output. This might not be as interesting as the partial results or effects (modifications of the content of the memory). Usually these effects are called side-effects.

There are some crucial ideas above: one is that we (or the appropriate devices) compute functions; the other is the role of the $list-of-instructions$ and of the CPU. The CPU and the $list-of-instructions$ are the kernel of the whole model.

The description that we offered above is obviously very close to what happens in a computer with a von Neumann architecture. The emphasis is on central processing and explicit instructions used in the computation process. Other presentations of the classical model focus on such properties of the computation process as productivity and systematicity.[3] The

[2] According to (Wilson and Keil 1999, p.154).

[3] The paradigmatic use of these concepts is in Jerry A. Fodor and Zenon W. Pylyshyn,

abstract character of the $list-of-instructions$ idea and of the language in which it is written the list make room for the generation of an unlimited series of results, even if the inputs are limited. It is also possible, from a set of functions, to construct other functions and so on. The disadvantage of the classical model seems to be that it is built around a process that is serial, driven by explicit instructions that are executed by a central processing unit.

9.1.1 J.R. Lucas and the Idea that Minds Are Not Machines

The Oxford philosopher, J.R. Lucas formulated an argument against the idea that minds are like the computers.[4] The argument uses Gödel's incompleteness theorem.

Any formal system that is rich enough[5] is bound to be incomplete. There are sentences which are true, but which are not part of the system itself.

Imagine now that someone tries to plan a human mind completely. This means that a computer is built and one has to write a program that generates all the states of a mind. Lucas showed, using Gödel's incompleteness theorem, that this is not possible. In order to imitate the reflexive processes of human consciousness, the machine had to be constantly transformed into a new machine.[6]

We have used from this argument that part which proves that no plan can be truly universal. New parts have constantly to be added and this extension cannot be supervised by a plan that is more encompassing than any other plan.

Lucas's argument is directed against the very possibility of artificial intelligence. This has triggered a very heated debate.[7] This question is however out of the scope of the present book. Even if artificial intelligence

"Connectionism and Cognitive Architecture: A Critical Analysis", 28 (1988), pp.3-71.

[4] J.R. Lucas, "Minds, Machines, and Gödel", *Philosophy* 36 (1961).

[5] In the sense that it contains a version of number theory.

[6] "It means that a conscious being can deal with Gödelian questions in a way in which a machine cannot, because a conscious being can both consider itself and its performance and yet not be other than that which did the performance. A machine can be made in a manner of speaking to 'consider' its performance, but it cannot take this 'into account' without thereby becoming a different machine, namely the old machine with a 'new part' added"(J.R.Lucas, "Minds, Machines, and Gödel" apud Douglas Hofstadter, *Gödel, Escher, Bach* [New York: Vintage Books, 1980], p.389).

[7] For a rebuttal of Lucas's argument see Hofstadter, *Op.cit.*.

is possible, this does not entail that *that kind of intelligence* would have the ability to plan human interactions in a way that otherwise is not possible.[8]

9.1.2 The Knowledge Problem from the Perspective of Computer Science

Computers work only with algorithms. The question that might be asked immediately concerns the impossibility of catching in this way more elusive forms of knowledge, practical, tacit forms of knowledge or the knowledge that we possess as a result of being-in-the-world.

Philosophers like Hubert L. Dreyfus argued, in a neo-Heideggerian manner, that computers are *in* the world as any other machine, not like human beings. The 'in' plays a crucial role in this type of argument. He wrote a famous book on the limits of artificial intelligence.[9]

This is not exclusively the point of view of philosophers. Terry Winograd, undoubtedly one of the most creative researchers in the history of artificial intelligence, also adopted, two decades ago, this perspective.

It is not difficult to explain what kind of problems contributed to the evolution of Winograd. Let us consider, for example, the problem of understanding. Does a computer that answers questions like "what is the time now"? *understand* such questions? Or does a computer program that extracts your name from a sentence of the form "My name is..." and uses it later to say "Please,..., read the next sentence"! *understand* something? Winograd argues that it does not understand.

The program has obvious limitations in situations that were not anticipated by the programmers.[10] An extensive program might create illusions, with its very adequate answers, but the limits are still real.

According to Winograd and Flores a person understands something when she enters into a commitment. But how could a computer program enter into a commitment?[11] Mental terms are not appropriate for programs,

[8] The existence of artificial intelligent creatures would raise however ethical problems for us. These questions will undoubtedly be very hard for humans. For the moment they might be left open, since they are strictly speculative questions.

[9] H.L.Dreyfus, *What Computers Can't Do: The Limits of Artificial Intelligence*, second edition (New York: Harper and Row, 1979).

[10] "Given the sentence 'I am swallowing poison,' it will respond 'How long have you been swallowing poison'? rather than responding as a person would to implications of what is being said that were not anticipated in creating the pattern"(T.Winograd and F.Flores, *Understanding Computers and Cognition* [Norwood, N.J.: Ablex, 1986] ch.9, sec.4.).

[11] Winograd and Flores, *Ibidem*.

which are not able to react to a breakdown with a shift into a new domain, with new commitments.

The work of Winograd and Flores has implications for organizations. From this perspective, organizations are not mechanisms. They are network of commitments. The flow of conversations becomes more human. Computer programs can only facilitate this flow, but they cannot replace it.

This kind of criticism of artificial intelligence has a pattern similar with the Hayekians' rejection of central planning. The argument is again that human beings use knowledge or act in ways that cannot be captured in the planner's database and algorithms. If this criticism is relevant in the case of artificial intelligence is not relevant for the topic of this book. All that matters from the point of view of the argument of the book is that they would not make life easier for the planner.

9.2 Connectionism

The attempt to incorporate into a computer program all the reactions in a certain type of situations is obviously a task that cannot be fulfilled. But one can try to make a program that learns or evolves.

The use of a central processing unit has also been questioned. If one combines such requirements as the capacity to learn and decentralized processing of data, then the result is an alternative model.

The alternative model is basically parallel, not entirely driven by explicit instructions and without a central processing unit. It is inspired by the structure of the brain. However, instead of neurons there are processing units (which are far from being as complex as the neurons in the brain). The units are connected and form a network. Each connection has a weight. For each unit there is a threshold function: if the inputs into that unit are above the threshold, then the unit fires along a connection. We may imagine a more sophisticated threshold function. What is important is however that each unit can compute the threshold function, compare the result with the threshold and take a decision to fire or not to fire along a certain connection with another unit. Weights are important because they regulate the strength of the connection. Weights might also be negative. Changing the sign of a weight transforms it into an inhibition. The secret, so to speak, of the neural network is that it lacks both a central unit and an explicit $list-of-instructions$ for changing the weights of the connections.

Units are organized in layers of units. A layer might be, for example, the input layer (the door through which appropriately encoded inputs are injected into the network). Another layer might be the output layer. Of

course, layers may have just one unit (an output unit for the whole network or something similar). There are also hidden layers of units, which play in many networks a key role.[12]

Networks are - after all - another way of organizing computations. One may use networks in order to make all kinds of computations. But, in contrast with the classical model, the network performs a dispersed computation. There is no special, central processing unit.

There are also interesting parallels to be made between the neural network models and statistical models.[13] Statisticians have their own claims for solutions similar to those offered by neural network computations. If we accept that statistics is strongly tied to the mathematical treatment of social phenomena, then this parallel might encourage the use of neural network models in social science.[14]

9.3 Computer Models in Social Science

An obvious application of neural networks in social science is in practical economic computations: one may compute various functions using neural networks. Sometimes the classical way of computing the relevant functions may take a lot of time.[15]

There is, on the other hand, an ample tendency to combine economics and cognitive science.The literature on complex models with agents is

[12]For more information, see for example Valluru B. Rao and Hayagriva V. Rao, *C++ Neural Networks and Fuzzy Logic* [New York: MIS, 1993]. According to the authors, the construction of a neural network has three main aspects: architecture, determining and changing the weights and recall. When we talk about architecture we talk about the structure and topology of the network. The process of determination and changing of the weights on the connections between the units is very important. It is important to note that no explicit pattern for the weights of the network exists before it starts functioning. Recall means, after all, the normal functioning of the network, using it for recognizing faces or remembering phone numbers etc.(cf.ch.1)

[13]An important task for statistics is to find patterns in data. Sometimes, neural networks are even better for solving this task than traditional statistical methods. See, for example, James V.Hansen, James B.McDonald, Ray D.Nelson, "Time Series Prediction with Genetic-Algorithm Designed Neural Networks: An Empirical Comparison with Modern Statistical Models", *Computational Intelligence* 15, no.3 (1999), pp.171–184.

[14]There is a handbook in which it is explained the use of networks as a statistical tool for social sciences: David Garson, *Neural Networks: An Introductory Guide for Social Scientists* (London: Sage, 1998).

[15]Rao and Rao, *Op.cit.* offer the example of mortgages: it takes a lot of time to gather the relevant data and to introduce them into the system. It also takes a lot of time to compute classically the result. But the speed of a trained neural network is significantly faster.

growing constantly.[16] Agents might model neural cells, individual members of a species or human individuals. Agents are autonomous or semi-autonomous and possess only pieces of the knowledge that is dispersed in the system. Agents interact and a system with agents is structured. A key idea in systems with agents is that intelligence or knowledge *emerges* as a result of the evolution of the system.[17]

Sociologists also explored the possibilities offered by computational intelligence.[18] Neural networks have been applied in various fields connected with social science, among others in international relations, in predictions of political behavior etc.[19] There are also applications in psychiatry in the prediction of suicide.[20]

The concept of network is however familiar to economists and sociologists, from other perspectives than artificial social intelligence. It is a concept that has been often discussed independently of the formal apparatus of neural networks. Yamagishi and others summarize the research done by sociologists on exchange networks and report their own results.[21] The concept of an exchange network is, basically, as follows: there are the actors $A, B, C, D, \ldots$, who are connected dyadically; connections are positive or negative; the actors have resources and accumulate profit points after the exchanges.[22]

What is the difference between the network models and the neural network models? It seems that the weights on the connections make the dif-

[16] There are a series of software tools for models with agents. See, for example, Miles T. Parker, "What is Ascape and Why Should You Care?", *Journal of Artificial Societies and Social Simulation* 4, no.1, <http://www.soc.surrey.ac.uk/JASSS/4/1/5.html>; the article is an introduction to Ascape. Models with agents can be also made in StarLogo and other systems.

[17] See Luger (2002, pp.15–16).

[18] William Sims Bainbridge, Edward E. Brent, Kathleen M. Carley, David R. Heise, Michael W. Macy, Barry Markowsky and John Skvoretz, "Artificial Social Intelligence", *Annual Review of Sociology* 20 (1994) is a program for the application in sociology of the models and techniques derived from computer science. Among other things, neural networks are also taken into account (pp. 415-416). The authors argue that information in a neural network is stored in connections, thus being distributed across the network and not tied to a certain address in the memory of the computing device (p. 415).

[19] Bainbridge et al., pp.223 ff.

[20] see, for example, I. Modai, M. Ritser, R.Kurs, S.Mendel and A.Ponizovsky, "Validation of the Computerized Suicide Risk Scale - a Backpropagation Neural Network Instrument (CSRS-BP)", *European Psychiatry* 17, no.2 (2002), pp.75–81.

[21] Yamagishi Toshio and Mary R. Gillmore and Karen S. Cook, "Network Connections and the Distribution of Power in Exchange Networks", *American Journal of Sociology* 93, no.4 (1988), pp.833–851.

[22] See Yamagishi et al., *Op.cit.*, pp.834-836.

ference. The weights are not changing the way they do in a neural network.

These vast array of researches may be summed up under the idea of *social simulation.* If we make again a parallel with cognitive science, then the key element is a new kind of experimental science: a science that experiments with models built on a computer. The whole idea, one might say, started with the criticism of the behaviorist approach to language and the study of linguistic competence (in contrast with linguistic performance). This leads to a study of abstract models. Then these models are translated into computer models and experiments with these models are the next step. These experiments resemble the traditional thought experiments, but they are done now on unprecedented scale.[23] What can be done in the case of the mind's faculties can be done for social systems.[24]

9.4 Networks of Agents

In the choice-points model there is no detailed characterization of the structure of the points. What we propose now is to build a model in which those points are states of a network of agents.

The agents are models of human individuals as agents/patients.[25] We do not use the expression 'agents/patients' because it is cumbersome. We just talk about 'agents'.[26] Like the individuals, the agents have limited cognitive abilities.[27] They are able to perform normal arithmetic calculations and to choose among alternative actions. They are also able to build plans for complex actions, but nothing unusual must be assumed in this respect.

Agents are connected by potential actions. When an action is actually performed, the connection is activated. Obviously, the actions have all the characteristics that were discussed in the first part. Agents arrange them in a stack; perform only the action on top at a given moment; actions have costs and may be performed at a price.

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[23] Because these experiments are related to *thought* experiments, even schools that have a strict aprioristic methodology, like the Austrian Economics, might use them. This sounds paradoxical, but it is a real possibility. This book however does not claim that research should be limited to *only* this type of experiments.

[24] A journal on this topic that is easily available is "The Journal of Artificial Societies and Social Simulation"<http://www.soc.surrey.ac.uk/JASSS/4/1/3.html>.

[25] See on page 32 for the discussion about agents and patients.

[26] This is also the standard practice, since there is a huge literature on 'agent-based models'.

[27] Individuals do not possess some special "market competence" as in Child's reconstruction of libertarianism (see refsec:DirectIndividualism).

Like the units in a neural network, the agents have associated activation functions. The result of an activation function determines if an action is executed or not. The arguments of an activation function are the inputs of the agent and other elements, including something similar to our usual budgets (some constraint of this type on the actions that the agent might perform).

As in the simpler model with choice points, there are various possibilities of action. At a given moment, the agent can choose among the various connections. The action that is performed entails a choice.

Why would an agent choose to act along this connection rather than along that connection? The real novelty of this model is the way we interpret the weights on the connections. The weights of the connections are monetary prices. The weights, as in the case of a neural network, are changed through a process of that is internal to the network. It is not the result of some program that controls the change of the weights.

The main novelty of this model is the introduction of money into the model. This can be done, of course, in a simpler extension of the choice-points model, along the lines of the traditional argument that money are facilitating complex interactions. We have a strong reason to believe that it is better to consider models with money at this level.

At this level we have a nice way of talking about kinds of monetary prices. There is a price in the simple and direct sense of transfers of money from one agent to another agent. The other kind of price is the price-as-weight of a connection. This kind of price offers to the agents the possibility to compare different connections.[28]

The agents, in their calculations, use the weights on the connections. Let us say that at the other end of my street a trader is selling bread. The connection between the trader and me as an agent is a pair of actions (a money transfer plus a transfer of pieces of bread). For the moment, there is no alternative. But, after a while, the topology of the network changes; another trader, also selling bread, appears on the street. Now, I have an alternative connection. I take weights on the two connections into account and calculate the value of the function that activates one of the connections.[29]

[28]Lange thought that Mises had confused different types o prices.We have now the possibility to vindicate Mises. In this model it is possible to refine the concept of price and use different kinds of prices. The weights on the connections, for example, give the agents the possibility to discriminate between alternative interactions with other agents.

[29]The example is inspired by the classical analysis of Hotelling. For more details on the tricky sides of the example (the distance to the trader may be taken into account too) see Friedman (1990, pp.551–552).

In the example that we have discussed above we suppose that the agents are Adam-Smith-agents. When they calculate they look at their "interests"; i.e. they take into account their stack of actions at the given point, their budget, their position in the network and the effect of the weights on connections on these elements.

The weights on the connections change according to some rule. We may use an analogy with cellular automata and consider a rule for changing the rules that takes into account the state of a cluster of nodes that are located near each other in the network.[30] For example, if sellers on my street offer more and more bread and there are less potential buyers, the weights on connections are lowered automatically. If there is less bread and more consumers, then the weights are going up. This is an obvious adaptation of a very well known rule. We are not interested in the rules themselves. What is important for our argument is that the weights on the connections do not depend unilaterally on agents. In a traditional language, we may say that they are *intersubjective*, though no psychologism is implied by our use of this term.

The weights on connections make interactions between agents transparent. If, in the example with the bread, another trader anticipates the weight of the connection between the bread-seller and me, then she may calculate if it makes sense to come with another offer. Without the weights it is impossible to make such calculations.

No hidden or explicit order is assumed in the model. Agents just extend their connections and make plans for more complex actions. They also make plans for common actions. And all these activities increase the degree of complexity of the network.

A key feature of this model is that the agents can change the topology of the network. They are free to change the connections in the network. As in the above example, a trader can calculate if it makes or it does not make sense to join the network. They are free to join or to leave the network. Agents are 'free' in our technical sense ('free' as in 'freedom' and we distinguish 'freedom' and liberty).[31]

[30] We can make an analogy with the famous game invented by Conway. The game is called "Life". The game is very serious. It is a simulation of the evolution of a population of cells. The cells form different configurations. For a brief description of the game see Luger (2002, pp.493–496). A version of Life, adapted by Juan M. Aguirregabiria from a program written by John Dahms at Watcom, can be found on the web <http://tp.lc.ehu.es/jma.html>. In this version one can change the original rules of the game and experiment with different rules.

[31] See on page 3 the distinction between freedom and liberty. Here we really need to distinguish between different *types*.

9.5 Planning: A Reexamination

Before going on, we reexamine the problem of planning from an abstract point of view. This can clarify the whole story about the practicability of planning without resorting to special kinds of knowledge.

Looking at the network of agents the planners might say that it is like a neural network: the agents are like the units and between the units there are weighted connections. At least in principle, it is possible for a Turing machine to imitate the network.[32] Thus – would say the planner – it is possible at least in principle to replicate the working of the network in a system with a Central Planning Unit.

From our point of view, this is a possibility that we have taken into account. The impossibility of planning was already formulated for a centralized system. The possible counter-argument has no force from this point of view. It just shows that the network does not work like a great secret plan. That's why we have been prudent and we have not talked about a hidden order or a hidden hand that orders things in the network on a great, universal scale. However, one should consider the fact that the network is *from a practical point of view* a much better solution. It is well known that it can deliver results faster than the (very slow) corresponding Turing machine.

This is not all. We should also point out that in our model we talk about a network of *agents*. Agents are not exactly like the units of a neural network. In the model, they can change the topology of the network. On the other hand, the network itself offers a structure of incentives for the agents.

To this objection the planner might replicate with a double argument: increased speed of the computers in the planning center and an experiment. Let us consider for a moment an experiment in a thought-experiment. We imagine that the planners have written very sophisticated computer programs that are exactly replicating the possible actions of the real agents together with their network. The planners have changed a little their minds and they say that they are forecasting and helping people to make their own plans.

What would be the purpose of that experiment? The planners might explain that this kind of experiment is preventing a lot of suffering. When they make their plans real people make mistakes. They suffer as a result

[32] Turing (1936) showed that the Turing machine is a universal machine. For an informal introduction to the idea see Turing (1950). This is not only a pure logical possibility. There are a lot of neural networks implemented by programs that run on usual computers with a von Neumann architecture.

of their mistakes. Violence and fraud would have also no impact upon real people.

The flow of data to and from the planning center would be however a problem. It would be extremely complex and would slow down inevitably the whole process. The alternative would be to treat the real networks of agents as if they were a kind of experiment. Individuals have all kinds of hypotheses concerning their actions and test them in the network. They offer something, they buy, and they change their connections. This works as a kind of experiment because there are special protections inside the network. There are institutions that constrain the interactions. Private property is shielding the agents.

The planner strikes however back. he contends that private property is not enough. Private property prevents other people to make plans and to experiment with my property. But, argues the planner, this does not prevent me from all suffering. The planner claims that *a social safety network* must be added.

This brings into focus what remains from the idea of a great plan to make everybody happy. The society is, for the planner, as a kind of dangerous experiment with various conjectures concerning the course of the actions. Piecemeal planning is the solution in the case that these experiments fail. The critic of planning has now as problem to show that this specific kind of planning is misplaced.

9.6 An Interpretation of Economic Calculation

Mises insists that monetary calculation is the key of individual rational action. Without prices economic calculation is impossible.[33] There is no other way to calculate profits and losses.[34] Therefore, without economic calculation, individuals cannot assess the efficiency of a plan for action.

Mises points out the role of the institutions of the market. According to him, money prices can be generated only by a market that has adequate institutions.[35]

[33]There are many passages in Mises that are interesting from this point of view. In all of them he is categorical. "The problem of socialist economic calculation is precisely this: that in the absence of market prices for the factors of production, a computation of profit or loss is not feasible" (Mises 1966, p.705).

[34] "No method of economic calculation is possible other than one based on money prices as determined by the market" (Mises 1966, p.162).

[35]"Other critics of economic calculation fail to realize that it is a method available only to people acting in the economic system of the division of labor in a social order based upon private ownership of the means of production. It can only serve the considerations

If the market is suppressed, then certain specific agents of the market disappear. The bureaucrats cannot replace them and they cannot calculate without money prices. For Mises, such a key figure among the agents on a market, the entrepreneur, is an agent who uses money prices.[36]

All the agents on a market use prices. Mises makes a crucial distinction between the point of view of these agents and the perspective of a despotic mind. The tyrant places himself outside the market and is, of course, tempted to think in other terms than monetary calculation.[37]

The despotic mind faces however a terrible problem. It tries to work with values, not with monetary prices. This is an inescapable condition, since only the market generates, according to Mises, monetary prices.[38]

It seems however that Mises insists a lot on the role of monetary prices, but does not have an argument. Some critic might argue that this is merely an ideological exercise and, as well, somebody else might insist on the role of "human values" and blame money. After all, it would be superfluous to document the tradition that sees money as a diabolic device.

Nevertheless, Mises has an argument and we will try to look at this argument through the lenses of the network model. In a network model of human interactions we focus on two key elements: the weights of the connections and the budgets of each agent. This is a very simple way of capturing a fundamental intuition. The agents try to calculate what they lose and gain as they act.

When agents act, the weights on the connections change. Then, the agents take these changes into account and the process goes on.

In the language of networks, planning is an attempt to administer the weights of the connections from a center. If the planner also controls the

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of individuals or groups of individuals operating in the institutional setting of this social order. It is consequently a calculation of private profits and not of 'social welfare.' This means that the prices of the market are the ultimate fact for economic calculation. It cannot be applied for considerations whose standard is not the demand of the consumers as manifested on the market but the hypothetical valuations of a dictatorial body managing all national or earthly affairs" (Mises 1966, p.216).

[36]"Economic calculation in terms of money prices is the calculation of entrepreneurs producing for the consumers of a market society" (Mises 1966, p.216).

[37]"He who wants to employ economic calculation must not look at affairs in the manner of a despotic mind. Prices can be used for calculation by the entrepreneurs, capitalists, landowners, and wage earners of a capitalist society. For matters beyond the pursuits of these categories it is inadequate. It is nonsensical to evaluate in money objects which are not negotiated on the market and to employ in calculations arbitrary items which do not refer to reality" (Mises 1966, p.216).

[38]"It is only the market that, in establishing prices for each factor of production, creates the conditions required for economic calculation. Economic calculation always deals with prices, never with values" (Mises 1966, p.335).

budgets of the agents, then a considerable degree of control is achieved. This is not the comprehensive universal planning discussed in the previous chapter, because the thresholds and the threshold functions are still under the control of the agents.

If the planner tries, on the other hand, to imitate the working of the network of agents, he faces a subtle problem. What happens if certain features of the network have a *reflexive character*? These features refer to the network itself, without it they have no meaning. According to Mises, monetary prices are such features. If one tries to come with some corresponding property outside the network itself, then he faces the impossibility of comparing values that are tied to different agents and different choice points (i.e. states of the network itself).[39]

Mises's argument is very elegant and the planner has only one way out. The planner has to keep the market alive in some form. It is exactly the solution that has been adopted historically and we have already discussed it.[40]

The other approach would be to take the prices from some external source. The planner does not compute the prices, but takes them as data. In this case, the planned economy or the planned sector of the economy has to coexist with some real markets.[41]

The unplanned network is a great system of interaction among agents. If we look at it as if it were a neural network, then it also has the interesting feature of being like a huge computing device without a central unit. The calculation process goes in parallel in the different units. The web of connections is, on the other hand, changing constantly its associated weights.

Calculation, in this interpretation, has two dimensions. Each agent as a unit calculates her own specific functions. The whole network, without being planned to do this, is functioning like a huge dispersed computation process, the way neural networks do.

What can we say about the network from the point of view of knowl-

[39] "Prices are always money prices, and costs cannot be taken into account in economic calculation if not expressed in terms of money. If one does not resort to terms of money, costs are expressed in complex quantities of diverse goods and services to be expended for the procurement of a product. On the other hand prices-if this term is applicable at all to exchange ration determined by barter-are the enumeration of quantities of various goods against which the "seller" can exchange a definite supply. The goods which are referred to in such "prices" are not the same to which the "costs" refer. A comparison of such prices in kind and costs in kind is not feasible" (Mises 1966, pp.352-353).

[40] See 8.2.1 here.

[41] "But under interventionism and under a socialist system which is still in a position to resort to economic calculation on the basis of prices established abroad, things are not so bad" (Mises 1966, p.849).

edge? If we look at the network of agents as we look at neural networks, then we can examine a very interesting question from cognitive science and its consequences. In cognitive science there is an old dispute between concerning the representation of knowledge that enables agents to act. Is this representation *local* or *distributed*? In a neural network the representation of knowledge may be distributed among the units.[42]

From the point of view of a network of agents, one can argue that knowledge is distributed over the network. Agents may store bits of knowledge and the weights on the connections themselves may be considered as part of the knowledge used by agents for action.[43]

If we look again to the planning debate, it is difficult to see why the problem of the planner would be the centralization of knowledge. Even if this knowledge has been centralized, the planner would be unable to plan.[44] The calculation problem prevents him.

But this does not mean that there is no interesting problem concerning the knowledge that is spread throughout the network of agents. The weights on the connections are the problem. If the planner tries to work without the network, then he loses the very possibility to centralize those prices.

Mises's main point is precisely that without such prices economic calculation is not possible. The network of agents model focuses our attention to the same problem. Beyond this problem, there is also the knowledge problem and there is a connection between them.[45]

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[42] See the article of Tim van Gelder on "Distributed vs. Local Representation" in (Wilson and Keil 1999, pp.236–238).

[43] In his paper from 1945, F.A.Hayek suggested that the economic problem is how to use "knowledge not given to anyone in its totality"(Hayek 1945, p.520).
According to the interpretation that we suggested here, prices do indeed store information, but no price, examined individually, is going to tell us something.
The information is distributed across the connections of the network.

[44] Hayek seems to claim that it would be possible to plan. "*If* we possess all the relevant information, *if* we can start out from a given system of preferences and *if* we command complete knowledge of available means, the problem which remains is purely one of logic"(Hayek 1945, p.519). Unfortunately, from the point of view of the planner, logic does not solve all the problems. Hayek is wrong when he clearly emphasizes all those 'if'-s. They are not the only problem that the centralizing planner has to face.

[45] But one has to start with the calculation problem. Then comes the knowledge problem. Yeager (1994, p.108) points out rightly that "Hayek was elaborating on what Mises said about economic calculation". It makes absolutely no sense to make a sharp distinction between Mises and Hayek. But Hayek was wrong in the problem of the *logical* impossibility of planning. The network of agents model shows that even from the point of view of knowledge centralizing planning is impossible. It destroys the network or it distorts its functioning and thus destroys parts of the data that would be needed in the

9.7 Visible and Invisible Connections

The idea of a network of agents has also the advantage that we can exploit it in different chapters of a theory of human action. Contracts and institutions can also be viewed from this perspective.

Contracts, on one hand, make more rigid certain connections. The weight of those connections, practically, plays no role anymore if the contract is respected. According to the contract, certain actions have to be performed.[46]

If there is a contract, then connections between agents become visible. They become part of plans for common actions. Contracts are like a mark on the connection. The contract changes the conditions in which agents compute threshold functions. And it also makes predictable the actions, since agents can look at the marks on the connections.

Predictability is an effect that we can observe in the case of any kind of rule.[47] There is however a difference between this kind of predictability and the predictability that we see in the case of physical phenomena. No human rule can bring determinism into the human world. In every moment the predictability induced by rules is under the sword of some change in the course of action of the individuals.

Most of our connections are invisible. I walk everyday near many shops. I use to buy goods in some of these shops. Maybe one of the stores is my favorite for certain items. But there is no obligation binding us. I have no obligation to buy. The owner of the store has no obligation to keep the store open for me and bring the items I like.[48] If they close for a while, the connection is severed. It might never be restored.

Many discussions on networks use a graphical language. As the example above shows indirectly, the image of static units connected with lines that look like wires is misleading. The units are in reality agents who act and change their position in the network.

Connections are made and broken all the time. There is one phenomenon in the modern world that is a clear sign of this quest for con-

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algorithms used by the centralizing planner.

[46] Obviously, sometimes some people do regret the fact that they have entered into an agreement when they look at the evolution of the weights of the connections.

[47] Hayek argues that it is this feature of the rules that we call “the rule of law”. See Hayek (1986, ch.6) for a development of this idea.

[48] Planners do invent such obligations, of course. I am discussing here the question from the point of view of a theory of human action, not from the perspective of a set of historical facts.

nections in the networks: advertisement.[49]

9.8 Institutions and the Connections of a Network

At an early stage of the investigation we adopted the definition of institutions as rules that constrain interactions. Now, in the context of networks models of interactions, we can make it more specific.

Institutions contrast with plans. They are not imposing a pattern upon interactions. But they constrain. They do this by putting some marks on the connections. They also may bar some connections, in a direct or in a conditional form.

The institution of marriage (in my country) is constraining me, for example, to have just one wife. But it does this in a conditional form. It does not tell me whom I should marry. I may even marry nobody.[50] The constraints are relevant only if I do the respective action. The plan is something very different. For example, my family may have a plan to arrange a marriage. In this case, they may plan even the details of the whole interaction.

There is a contrast also between institutions as rules and the organizations that enforce the respective rules. Organizations must plan their activities. They do force at least certain patterns on the interactions. The wedding has its ritual. It is carefully planned. The institution of marriage just constrains the human interactions.

[49] The effort to create connections is a normal human endeavor, but it had been smeared by philosophers and economists who claim that "false needs" are generated in this way. Commenting the views of John Kenneth Galbraith, Murray Rothbard (1970, p.843) argues that advertisement "cannot *create* wants or demands, because each person must himself *adopt* the ideas and values on which he acts". In the terminology of the network of agents, this means that the connection proposed by the advertiser has to be activated by the consumer. In this case, there is indeed a knowledge problem. The advertiser tries to spread knowledge throughout the network. No wonder that the would-be planner, who has to centralize knowledge, does not look with a benevolent eye at the advertiser.

[50] The idea that law or rules might be power-conferring is important in the context of the debate on the command-model of the law. For details and the relevant literature see (Barry 1989, p.39).

Chapter 10

Markets as Networks of Agents

We have discussed three abstract models of human action and interactions. The first model is the choice points model. The second one is the planner model. The third model is the network of agents model. The first model focuses on the individual as a chooser among alternatives. The third model focuses on interactions. Its main novelty are the weights on the connections among agents.

The third model has a feature that makes it a natural representation of a market.[1] There is no central processing unit in this model. There is no center, like in the second model, from which decisions are taken.

[1] Birner (1996) argues that Hayek had a network model of the market. He even affirmed that the work of F.A.Hayek influenced the development of neural networks in its early phase (cf. (Birner 1996, p.16)). This claim is supported by the presence of Hayek's *The Sensory Order: An Inquiry into the Foundations of Theoretical Psychology* among the works nominated in the Cognitive Science Millennium Project <http://cogsci.umn.edu/millennium/lista.html>. But the book did not find a place among the 100 most influential works in cognitive science. Birner stresses key aspects of Hayek's conception, such as dynamic equilibrium and the evolution of social institutions, and makes a connections with the neural network approach of the mind.
Birner estimates that one can found more network models of the market in sociology than in economics. He mentions, among the economists who have suggested network models, the names of Alan Kirman and Robert Gilles. Both Kirman and Gilles have their web pages on the Internet. One can find Kirman's publications at <http://durandal.cnrs-mrs.fr/GREQAM/cv/kirman.htm>. Gilles's working papers are listed at <http://gilles.econ.vt.edu/research/WorkPap.html>. Gilles's work is especially interesting because he departs from more conventional models and assumes that the network itself is under evolutionary pressure (cf. Edward Droste, Robert P.Gilles, Cathleen Johnson, "Evolution of Conventions in Endogenous Social Networks" on Gilles's site).

10.1 Explanatory Gains

What can one hope to gain from the network explanation of human interactions? After all, there are, as we pointed out, equivalent models. The difference is made by the interpretations that we can construct upon different models.

Networks of agents make room for the idea of calculation. Monetary calculation is essential for the functioning of a market. Therefore the road is open for a model of the market. It is also easy to represent in this model the contrast between a free market and various non-free markets.

Which is the difference between this model and the usual approaches? To make a long story short, it seems to us that the main difference is not in the model itself. It is a model constructed around the idea that prices and monetary calculations play the key role on the market. There is nothing unusual in this claim. The difference stems from the use of the contrasts between the planner model and the network model. The idea is to illuminate the tensions of the human condition through the contrast between the models themselves.

There is another distinctive feature of the models. Their emphasis is on the form of a choice, not on the meaning of the actions involved in the choice. This illuminates two types of interactions between individuals.

The first type is based on shared meanings. It emphasizes communication.[2] Interactions take place between people who have common meanings for their actions.

Trade between people who belong to different cultures inspires the second type. Meanings of the actions might, in this case, be very different. Anyway, they are not important. The form of the interactions is important. As long as they agree on the form, the interaction can take place peacefully. The only results are exchanges. No shared meanings are the aim of the interactions. The only problem of the agents is how to make their actions compatible[3].

The advantage of the second type of cooperation is that it can take place across cultures.[4] It is the type of interaction on a free market. It is also the

[2]Many of the works in the literature on network models do in fact focus on communication in networks.

[3]Hillel Steiner has an interesting notion of *compossibility*, but he uses direct methodological individualism and focuses on rights. For more on Hillel Steiner see 3.1.2 here.

[4]When I was young, in the textbooks, there were examples with bad Europeans cheating natives: they offered glass and got gold. The authors missed however something important: that the value of glass-beads might be very different for various individuals. If somebody would object and claim that the Europeans had to inform the others about the

basis for liberty in society.

10.2 The Market Algorithm

Neural network models have algorithms for the change of the weights of connections.[5] We will analyze something similar for a network model of the market.

The very idea of freedom suggests that changes of weights may only be triggered by the actions of the agents. Metaphorically speaking, human action is the speculation of possibilities. Human individuals invent various forms that are, from a pure physical point of view, accidents. These happenstances are not excluded by physical laws[6], but they are not the necessary result of some causal chain that would lead to the same result without any human action. A purely causal explanation of human action has been rejected. In this sense freedom is inherent to human action. Agreements are the recognition of the fact that all sides share this fundamental human condition. Nobody can rely exclusively on necessity. She has to rely on the complementary actions of other agents.

This was the metaphysical picture of the whole situation. Beyond it we have to look for the interplay of agents' calculations and adjustments of the weights. No central unit is supposed to be involved in the change of the weights.

In order to go beyond the metaphysical picture, let us use a very trivial example of a competition on a market. There are only three agents *A*, *B* and *C* in the model. First, only *A* and *B* form a very simple network with one connection. The agent *A* transfers (pays) a sum of money to *B* and *B*

"real" value of the beads, this would lead to an inconsistent perspective, since the people who resort to the glass-for-gold example reject the idea of integrating others into the European culture. The real good objection, I think, would be that the natives were kept out of the European market and monetary prices were not used or they were not transparent for them.

[5]For an introduction to backpropagation and other algorithms in neural networks see Luger (2002, pp.422–467).
The algorithms inspired by other biological systems are opening fields of research beyond the idea of an artificial neural system. One should especially mention the genetic algorithm. Its father is John H. Holland. For a brief introduction see Luger (2002, pp.471–491).

[6]The *anthropic principle* requires that we formulate physical laws that do not exclude the existence of life and observers, since we are observing physical phenomena. On the anthropic principle and the problems of cosmology see Ernan McMullin "Cosmology" in (Craig and Floridi 1998). See also Nancey Murphy "Religion and Science" in (Craig and Floridi 1998).

performs a service p to A. The weight of the connection between A and B is set automatically to g. The agent C joins later the network and establishes a connection with A; the connection is a potential action of type p. The weight on this connection is h and $h < g$ and this lowers the weight on the p-connection between A and B. If B does not will to perform p for less money, then the next time the connection between A and C is activated.

What shows this example of the classical relationship between demand for services and their prices? The first part of the answer is that connections change. They are not static. Old connections are deactivated. New connections are created. The whole model is dynamic.

The problem with connections is that they are bilateral. Who may sever an existing connection? On what basis? What would be the difference between the case of invisible and visible connections?

The institution of property is the answer to this problem. We will develop this idea in a separate section. For the moment, let us remark that the existence of a property right solves straightforwardly the problem of the disappearance of an invisible connection. Under a rule of private-property, in the above example, agent B or agent C decide to perform or not to perform the service p. On the other hand, it is A who controls the money and only A. She cannot be forced to pay for the service p.

We can put now planning in a new light. Planning can restrict the role of agreements on prices or it can both control prices and change the rules of property. From the point of view of the model, this means that the free market can be transformed into a non-free market in various ways: the most radical is to ignore the algorithm for the weights completely and put the money transfers under central control. In the example above, the planner decides to maintain a "fair" price f for each service of type p. There are two possible effects of this type of intervention: the network is still in place and the forced transfers generate automatically weights on the connections (with tensions between what would result if one computes with the weights and the forced transfers); the other possibility is the destruction of the network and the retreat of the agents into a system of direct relations (traditional community connections, for example).

If the network is not distorted using force or fraud and it is not frozen by the rules of tradition, the complete picture of network is very dynamic. Weights and connections change frequently.

We must dissipate a possible misunderstanding: the weights on connections are a theoretical construct. They do not appear in any statistics. Even if people make their connections visible through formal agreements, the weights cannot be stipulated explicitly. Only historical prices-

as-monetary-transfers appear in statistics.

Another aspect of the prices that one can easily or relatively easily see is a proposal for a monetary transfer. When we go in the shops we see proposals made by the offerors. If we are the offeree, we may make our own proposals and negotiate. The idea is that we do not negotiate the weights of the connections. We may influence them, through honest or dishonest deals,[7] but we do not negotiate them directly.

Weights do not exist without a network. That's the planner's problem when he destroys networks.[8] Individuals guess and anticipate the weights of the connections. These guesses and anticipations are the inputs of their activation functions. The market, on the other hand, has its own way of determining the weights. That's why the whole network is not mechanical or predictable.[9]

Total and piecemeal planning are introducing an inherent tension between prices-as-monetary-transfers and prices-as-weights. Planners are a special kind of fixers. They manipulate[10] the monetary transfers and hope to remain uncaught. For people who have lived long enough in Eastern Europe there is no need to explain the consequences of these actions. The monetary transfers might be low, but the weights are high and a tension develops in the network.[11]

It makes sense to think that we can simulate everything using a computer model. We should however take into account that simulation is not the real game.[12] Why it cannot replace the real game?

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[7] For dishonest deals, see the final discussion on fraud in 15.3 here.

[8] See more on this problem in our interpretation of Misesian calculation in 9.6.

[9] No element or structure in the model does the entire work. The market itself is not some independent entity that acts as a hidden leader and issues orders.

[10] Their actions cannot have another character. If they pretend that they are master-speculators, then they should not be bureaucrats, but speculators on a market. They also should not enjoy some special position or privilege as speculators.

[11] Of course, this tension can be easily captured in a neoclassical model with demand and supply curves and equilibrium prices. What is more difficult to capture there is the reaction of the individuals. The neoclassical model predicts that they will transfer more money than the official price. But they might do other things too. They develop new connections. The network itself becomes totally different and, instead of monetary weights, personal acquaintance is the main means for assessing connections. For a concrete example see Naishul (1993, p.37–38). Naishul compares meat prices in state-owned shops in Moscow (at the beginning of the 1990s) and prices on the farmers' markets. The difference is 7 to 50 and indicates a clear tension. For the role of personal ties see also Naishul (1993, p.35)

[12] In the philosophy of mind, John Searle is famous for his Chinese room argument. The gist of Searle's position is that we can simulate a mind, but we cannot create an artificial mind. There is always a difference. See Searle's site at <http://globetrotter.

First, simulation cannot replace the real game because we just explore some ways of changing the weights on connections and the connections themselves. Individuals have always other possibilities too. It would be unrealistic to claim that we have some sort of complete model. Simulations based on the network model cannot replace the real network. They are an example of "what if" analysis. This is in essence social science. It can explain, but it cannot predict because there is nothing to predict.

Second, action depends on knowledge. We cannot however predict the growth of knowledge.[13] Since we cannot predict the growth of knowledge, we cannot predict the way in which individuals will form new connections and assign weights to those connections. Again, there is nothing to predict, because unexpected things can happen.

But we can anticipate the course of interactions.[14] This idea of anticipation may seem strange and obscure.[15] If we take it to be a guess, then it is obscure. It is possible to guess the course of interactions, but this is not the point. We were discussing about a simulation, not statements that

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berkeley.edu/people/Searle/> (last visited by me at 19 May 2000). Searle goes however beyond this difference between simulation and real mind and argues that the very analogy between a mind and a computer is wrong (see, on his site, "Langage, conscience, rationalité: une philosophie naturelle"[Language, consciousness and rationality: a natural philosophy], Searle's interview in *Le Débat*). For Searle's philosophy of mind and his criticism of cognitive science see his book *The Rediscovery of the Mind* (Cambridge, Mass.: MIT Press, 1992). His Chinese room argument is in "Minds, Brains and Programs", *Behavioral and Brain Sciences* 3 (September 1980)[together with 27 peer commentaries and Searle's reply].

Our own commitment here to computers and computer models is minimal. It goes as far as it is necessary to capture the working of the ideas (i.e. algorithms) behind the plans. We want to answer questions like "who is in the best position to plan what?" and give an explanation to the answer.

[13] See Popper (1945) for a discussion of this problem.

[14] Mises says that "the speculators merely anticipate the expected alterations"(Mises 1966, p.457). The idea of *anticipation* is very important for the explanation of human action. Anticipation is very important because "the only source from which an entrepreneur's profits stem is his ability to anticipate better than other people the future demand of the consumers"(Mises 1966, p.290).

Popper fails to make a distinction between prediction and anticipation. The argument in Popper (1945, pp.vi–vii) is a *non sequitur*. For example, let us say that we die because of some cause; we do not know the causes; from this is does not follow that we cannot anticipate death. I want to thank professor David Miller, from Warwick University, for pointing out to me the *non sequitur* in Popper's argument. However, despite the formal fault, I think that the gist of his broad argument against historicism is correct.

[15] We should not forget that in real situations there is an interplay of anticipations. An agent anticipates something, but another agent guesses this anticipation and the result is that things are not going the way the first agent expected them to unfold.

might be true. In order to simulate, we have to fill the variables with data, not just say which will be the final result. Anticipation must be something else.

Anticipation is a speculative move of an individual. The individual severs some old connections. Makes new connections. In sum, tries to be in a position from which she can reap more profits than from the old position.

Other speculators watch the speculator and thus what she does becomes a reason for other speculative moves. The free market is not only constantly changing but it has its own in-built reflexive dynamics. In various degrees, all the individuals speculate. If this is true, then in this model there can be no equilibrium point.[16] If somebody calculates such a point at some moment, then this is an input for the process that leads to new anticipations that change the point and so on.

10.3 Property and the Network

Let us say that my cat gave birth to kittens. I may go to a market-place with the kittens and try to sell them. I may keep the kittens. Nobody may force me to sell the kittens. If somebody takes a kitten without my agreement, then I may punish that person, ask for damages or, at least, take back the kitten. Property gives me the right to establish or not establish a connection. Nobody else can do this.

Weights have a simple existential presupposition. Without a connection it does not make sense to assess its weight.[17] There must be a connection

[16] According to(Kirzner 1997) the Austrian way of treating markets differs sharply from the mainstream model of competitive equilibrium. However, the equilibrium model is not totally irrelevant for a theory of human action. The insight of the Austrians is that markets have a dynamic character(Kirzner 1997, p.64). For a review of the literature on competitive equilibrium see E. Roy Weintraub, "On the Existence of a Competitive Equilibrium: 1930-1954," *Journal of Economic Literature* 21 (March 1983): 1-39.

[17] Buchanan (1975, p.17) discusses the purchase of watermelons. He notes that he and the seller "transact exchanges efficiently because both parties agree on the property rights relevant to them. Both of us acknowledge that the watermelons, stacked neatly by the roadside, are 'owned' by the salesman, or by the person or firm for whom he acts as agent. Both of us also acknowledge that I have the rights of disposition over the money in my pockets or in my bank account". For James M. Buchanan the *rule* itself is the presupposition. In our model, the existence of the connection is the problem, but this in its turn depends on respect or disrespect for property *rules.* One should also note that, even if private property is ignored and the connection is forced by some external intervention, the network algorithm still assigns weights to the connections.

in order to make sense to look for the weight on it. The creation and the activation of the connection presuppose a rule of property.

The case of the kittens concerns what we have called invisible connections. I am under no obligation to show up in the market-place with the kittens for sale or establish any other kind of connection. Some people may expect me to sell the kittens. They may even anticipate that I am selling regularly kittens, but no rigidity is attached to these connections.

Now, let us say that I lend the cat for a while to somebody else. It does not matter if our contract is written or not written. In the terminology proposed here, the connection is visible. Who is entitled to break up the connection and when? The cat is still my property. The problem is that if one says that the other person is entitled to keep the cat for a while, this is contradicting the very idea that the cat is during all that time my property. The other person might be entitled to damages, but cannot keep the cat.[18]

The question is even trickier if we assume that the cat has rights. For example, she may have the right to be treated gently. This would limit my possibilities to establish connections.

Now let us reverse the roles and suppose that somebody is selling a house to me. We turn the example into a classical problem, if we assume that the house has hidden flaws.[19]

The owner knows about the flaws, but I am unable to perceive the deficiencies. I inspect the house. We discuss the price. The owner sells me the house as if it were flawless.

I own the house now and I discover its flaws. According to Child's argument, a libertarian cannot object to the transaction in this moment. There are no damages to be paid.[20] All this happens because Child thinks that the libertarian argument *must* be a direct individualist argument.

Let us look however at the situation from the perspective of the network model and of the newly added private-property rules. The connection established between me and the former owner of the house had a dual nature; but there was no problem with the connection itself. The former owner did not grab the money from my purse. I did not occupy his house.[21] I had also the opportunity to inspect the house.

The misrepresentation of the state of the house did however distort something. It has distorted the weight attached to the connection between

[18] See also the example with the books in 15.3.

[19] See also 15.3.

[20] Child uses the concept of market competence: I had the opportunity to exercise my market competence and I failed to do this. See 5.3.2.

[21] Compare this transaction with Buchanan's watermelon transaction.

us. The weight as such is not the property of either of us. It would make no sense to assign it to an agent, since it is the result of the dynamic of the network. But agents can, using fraud or force, change the weights (and the topology of the network).

This argument seems to prepare the road for a formidable objection. The planner might argue that this is "his territory". A special agency should regulate all the transactions and impose certain duties to sellers.

The counter-argument to this interventionist argument is that it leads to exactly the same effect as fraud. The weights on the connections are distorted and agents are confronted with "offers that they cannot refuse". The cure that leads to care for the individuals despite their will is leading to a distorted network.[22]

10.3.1 The Incompleteness of Rules

The rules of property cannot cover all the cases in which individuals interact. Some of our actions have a lot of effects on other individuals.[23] Rules of property are formal rules, but still it is impossible to list all those effects and establish rules for each case. Even if we try to find out rules for a class of cases we are not in a better position, since new classes of cases can emerge.

A more difficult problem seems to be, however, to formulate rules for changing the rules. Again we find ourselves puzzled by the question of the conditions in which such rules should be applied.

Reflexivity lurks around in the case of a change of rules. Somebody may be in the situation of changing a rule that concerns his own property. If a tyrant, for example, can change the rules of property from time to time

[22] This is the (partial) answer to Child's argument. See more on this in 15.3 here. The second part should show that this argument follows from a conception focused on individual liberty.

[23] Friedman (1989, p.168) notes the following absurd consequences of absolute rights of property: "Carbon dioxide is a pollutant. It is also an end product of human metabolism. If I have no right to impose a single molecule of pollution on anyone else's property, then I must get the permission of all my neighbors to breathe. Unless I promise not to exhale". Sheldon Richman replied to Friedman's argument and a very interesting debate took place (see "Hard Cases and Universal Principles", *Liberty* 3, no.6 [July 1990], pp.39–40, 50.). Richman argued that "rights come from the objective goodness of each man's pursuit of happiness"(*ibidem*, p.40). Friedman counterattacked and claimed that rights are useless for answering certain questions. Even more important is Friedman's observation that property law is not the source for solutions to any questions. Contracts, procedures, constitutional law are also important. David Friedman argued that they cannot be based on moral philosophy (cf. *ibidem*, p.50).

and take the property of others, no free market is possible anymore.

The desperate solution of making the rules very detailed and concrete does not work either. We can replicate the argument developed on the planner model. It is also significant that the respective argument was formulated for a web of interactions. Trying to formulate the rules in this way even for a separate web of interactions does not help.

Incompleteness is the trait of any system of rules that is sufficiently complex. If the system includes rules for its own change or some other means for changing the rules, then it is either incomplete or it enables arbitrary action.

The argument developed so far is that markets have a system of rules for property that is never going to be complete. This raises interesting problems in connection with the development of the system of rules.

10.4 Power and the Network

Is it possible to talk about power on a market? What about somebody who has a lot of money? It seems that she has power. But what would be this power in the case of a free market? She still has to respect property and agree on prices. One could talk about a lot of possibilities for interaction. This is true.

Let us think that this wealthy person uses her money in the following: she pays some guys to take you into her shop and force you to buy. If we talk in all cases about power, then we obscure an important feature of the actions: the use of force.

The real problem is how to define force in a formal way. If we think in concrete terms, 'force' seems to be a very clear concept.[24] Think however about the possible puzzling example of a super-masochist.[25] In this case,

[24] Rothbard (1970, p.67), when he talks about violence as an interpersonal action, resorts to plain natural language and means by violence the use of physical force or the threat to use it. This is in perfect agreement with his argument, two pages before this, that *verbal logic* is enough in the theory of human action. However, as Rothbard recognizes, in this way the meanings are constantly sticked to our discourse. The problem that I see here is that we are deprived in this way of the possibility of a formal approach. Where is the *a priori* core of the theory going to come from? Meanings, especially those of words in natural languages, can play very nasty tricks.

[25] The example is inspired by the famous "super-spartans" of the philosopher Hilary Putnam. Putnam uses these imaginary characters in a thought-experiment that is directed against logical behaviorism (see Hilary Putnam, "Brains and Behavior"(1963), reprinted in David M.Rosenthal, *The Nature of Mind* [Oxford University Press, 1991], especially pp.154–155). It is not a coincidence that such an argument came up in a debate about

she is supposed to like the use of force in the usual sense of the word. She is even going to pay for that. And, to make things worse, she does also like some of the things that we might like.[26]

We shall use the imaginary case of the super-masochist for the discovery of a formal characterization of force. In formal terms, we should go back to the ideas of action, agent and patient. Any individual may become inadvertently the patient of an unsolicited action. She might like to be the patient of that action. She might simply ignore it. In the third case, she would like to avoid being the patient of that action. She would even pay for that. This seems to be the most appropriate formal trait of force or any action that would intimidate or even simply be inconvenient for us. The individual pays or try to pay or would pay another individual for an omission, not for an action.

How can we look now at the case of the super-masochist? The deviation from the normal use of the term "force" is not really a problem if we remember the formal characterization of value. Obviously, the super-masochist values what others reject. There is nothing unusual in this.[27]

A possible objection could be inspired by the example of the farmers who are paid by the government for the non-cultivation of their land. Let us suppose that the farmers do not threaten anybody. Still they receive money for not doing something. The answer is that the government is the active part here. The intervention of the government tries to maintain prices at a certain level. The government is not the patient of the action of the farmers. It resembles the case of a person *A* who pays the postman for not delivering a letter to *B*. This is a nasty trick indeed. If the letter were precious to *B*, he would pay the postman for the delivery. In the case of the farmers, the consumers are also involved, because they have to pay higher prices for agricultural products.

Another possible objection could be formulated like this: why do you not use the concept of *consent* and then define the other concepts? But

behaviorism. Logical behaviorists claim that we grasp the meaning of "pain" by pointing to behavior. There is here a similarity with the theory of action and the claim that values are demonstrated by action. But there is also a very important difference: we focus here on the theory of *action*. We are looking for a formal grammar of action. The problem of the nature of the mind is not on our agenda.

[26] There is no perfect reversal between pain and pleasure in her case.

[27] "The notions of abnormality and perversity therefore have no place in economics. It does not say that a man is perverse because he prefers the disagreeable, the detrimental, and the painful to the agreeable, the beneficial, and the pleasant. It says only that he is different from other people; that he likes what others detest; that he considers useful what others want to avoid; that he takes pleasure in enduring pain which others avoid because it hurts them"(Mises 1966, p.95).

how do you demonstrate consent? Is consent revealed by the opinions? Opinion might be constrained by force and we are back to the problem of force. Revealed opinion might conceal the true opinion, when somebody tries to play a trick to others. The only demonstration of consent is again action and we are back to the problem of finding out if the action was forced or not by somebody.

Now we may go on and restrict the concept of power to the use of force. Power is associated with the use of force. Of course, the use of force might be indirect. The propaganda of the power machine tries to persuade everybody that there are other reasons for paying than the avoidance of force.

From this perspective on force, there can be no power on a free market. Wealthy people have a lot of possibilities for interaction, but this is obviously different from the use of force. Indeed, they pay for what they desire.

10.5 Markets and Liberty

Sometimes liberty is defined in opposition to power.[28] It is the same idea that we want to capture, but from the perspective of our indirect individualist approach. Thus we have to refer in the definition to the concept of network of agents. We also have to avoid circularities and the simple, trivial reference to freedom as a metaphysical condition of human action.

The solution is stratification. The model is already stratified, because a network is made up of layers. And we may add new networks to a network and so on. All this is done in special conditions: the connections are not determined by any physical necessity. We might use a metaphor and say that the agents are not rigidly tied to some position in the network. The connections are constantly made and broken. This is freedom as a natural condition of the human beings.

Let us go back to the concept of force and try to refine it a bit. If we examine a network, then the use of force has at least two faces. It is like an invasion. Somebody is uninvited, but joins the network. The newcomer changes the network. The others would pay and get rid of the intruder or would pay for getting out of the altered network. The other face of this situation is expulsion. Force is used in order to kick somebody out.[29]

[28] It is the lack of arbitrary power; i.e. the non-arbitrary use of force.

[29] Aggression is not limited to invasion of the network from the outside. Expulsion may also be aggressive. Aggression and defense are actions that cannot be fully identified on the basis of formal features. Intentions and initiatives of the agents have to be interpreted.

After this backtrack, it is easy to notice symmetry between two cases. We face the same type of problems if we want to characterize fraud. Again, we have to ascend from a content-oriented approach to a formal one. Deceit is synonymous with fraudulence and dishonesty, with deception and misrepresentation, with dissimulation. Feigning, pretending, dissembling, luring or seducing, all kinds of actions might be used with the aim of bringing somebody into a network. The unfortunate thing is that in order to identify these actions we have to look for aims, intentions and so on.

Formally, we should look just for actions. In the case of force, it is somehow easier. People try to avoid the actions of others. They pay. They run away.[30] Anyway, they do something that is a clear reaction that tells the others that force has been used. When confronted with deceit, the individuals do not know what is really going on.In order to be efficient, force has to be conspicuous. By contrast, deceit has to be invisible. It is a pure tautology to say that if they are deceived, people do not know this.[31]When they know, they just pretend that they are deceived.[32] Therefore, in the case of actual deceit, payment is not a test. The individual has no possibility to know that it would be wiser to pay. If she had noticed the trick, then she would not engage in any relation. There is nothing to pay for in that case.

What does the normal individual do on a market? The first idea is to check if somebody acted in the same way before. Then you might be interested in some tests. Thus, there is payment, but not to the agent you want to cooperate with. One pays for more information about a possible transaction.

We may conclude now and make some generalizations. For a given individual and a network there are two basic situations. The individual is already in the network and is confronted with the problem of getting out of the network. The individual is not part of the network and is persuaded to join the network. Individuals, in both cases, can use force or fraud.

Getting in or getting out of a network without being forced or led on, establishing connections inside the network without being forced or led on - this is the basic problem of liberty. We may define liberty as the institutional arrangement that makes possible for individuals to join or leave a

[30] All these actions are considered from the perspective of the *patient* of the actions of the others. Of course, individuals - confronted with force - also resort to the use of force as a defensive action. We stick however to the patient's perspective because we want to identify what counts as use of force or fraud.

[31] Child asks the libertarian to be people who cannot be deceived. This is obviously an unrealistic requirement.

[32] Parents might do this. This is a sign that they love (maybe in a wrong way) their children. Lovers may act in the same way.

network and make, break or activate connections inside the network without being under the threat of force or being the victims of fraud.

Liberty is not just the freedom to do things. This is inscribed in the nature of human action.[33] The system of rules should be compatible with the requirements that we have identified above. Liberty is the institutional way of keeping freedom in a network of agents at its maximal possible level.

The free market is a paradigm case of liberty. The word 'free' means here that there is such an institutional arrangement that permits to anyone to enter the market or to leave the market.

The characterization of liberty offered here stresses the idea that liberty is a criterion for institutional arrangements. We did not specify any concrete institutional arrangement. We just said that liberty is the criterion for establishing an institutional arrangement.

There are other criteria that have been proposed for institutional arrangements. The most important are efficiency and justice. The present argument, as it unfolds, leads to the conclusion that liberty is the fundamental criterion.

10.5.1 Corrolary: non-interference with individual plans

There is a useful consequence of this characterization of liberty. We discuss it on a simplified example, since the generalization is straightforward.

Let us say that the individual Z has a plan p for an action. The plan has a certain algorithm. It involves a series of steps, the examination of some conditions, decisions and so on. What would mean that others interfere with the plan?

There are two types of situations to be considered. First, we should take a closer look at "conditions". When we talk about "examining the conditions and taking a decision" in the plan of action we have in mind a conditional structure of the form: if C, then a. The condition C is true or false. If the condition is true, then the individual performs action a.[34] The

[33] We may imagine that Winston Smith, the character from Orwell's *1984*, resists to any kind of pressure. This would destroy the value of the novel, but nothing prevents us from imagining that, as long as he is alive, does only what he wants to do.
On the other hand, we might think that some evil character also does all that he wants to do. He is merely breaking any kind of rule.

[34] This is an elementary structure in an algorithm. There are plenty of concrete examples for it. "If it rains, I take the umbrella; else I go without the umbrella". Do not confuse this with the logician's discussion on the connective "if-then". The logician studies a *sentence* and what follows after "then" is a sentence, not an action.

condition *C* might be "I show up with a kitten for sale on the market". If I do not show up I am making the condition false, but, as long as I have no contract with *Z*, I am not interfering with her plan *p*, even if she has a strong desire to buy the kitten. Forcing me to show up with the kitten is the same as forcing me to establish a connection. This curtails my liberty. Thus, a corollary of the definition of liberty is that actions that change the conditions used in plans are not interferences.

Let us examine the second situation. This time the focus is on the *actions* that are part of the plan *p*. What happens if somebody obstructs an action? For example, *Z* goes to the market place to buy the kitten. Somebody kidnaps her until the kitten is sold. According to our conception about actions-as-connections, the kidnapping forces a connection. This is excluded by the idea of liberty. Thus it is an interference in the individual's plans.

The general idea of interference is very useful, because we can discuss what happens under two types of rules: some rules favor more interference with individual plans; another set of rules minimizes the interference with individual plans. Obviously, private property is linked to a minimization of such interferences.[35] For the full spectrum of implications of these ideas will be examined in the third part.

10.6 Locked in the Network?

Can somebody become the prisoner of a network? Yes, of course. Force or deceit can keep you in. The argument developed so far suggests that force and deceit are the only means that can do this. Payments are the test. One can pay for being let alone. One can pay for more information if she does not want to be alone.

Some people claim that monopoly is also a problem. Now, if monopoly is obtained using force or deceit the problem can be reduced to the problem of the use of force or deceit. Thus, in order to find a real problem about monopoly, we have to look elsewhere.

We will exclude from the analysis, for the moment, natural monopolies. We assume that the monopolist offers services that are highly valued by consumers. They stopped buying from others. Recent evolutions seem to show that this is the case in the computer industry.[36]

[35] On the minimization of interference see 15.1 here.

[36] Stan J. Liebowitz and Joseph Margolis have shown how deceptive are these examples. In their book on Microsoft they analyzed prices for wordprocessors and spreadsheets and came to an interesting conclusion: "Microsoft was not acting like a textbook monopo-

For some authors, the worst form of lock-in is the monopoly. Agents are locked in a network of consumers. The monopoly reaps the benefits, since it charges higher prices than it would charge in a competitive environment.

However, there has to be more than the mere presence of the monopolist in order to get the lock-in effect. If the state, for example, grants exclusive rights to only one phone company, there is something more: other companies cannot enter the market. Sometimes the monopoly is simply an illusion. In the software industry, the existence of an open source movement makes, for example, the difference.[37]

The fundamental misunderstanding concerns the service that is done for the consumer. The kernel of the problem is the nature of the connection between an individual and the monopolist. The choice point model is not relevant here. It is not an aim in itself to have all the time opportunities for choice. The primary criterion is liberty.

If we use liberty as a criterion, there is no problem in a monopoly as long as the individual may leave the network. To be more specific, if other producers may enter the market, then the monopoly is not a problem. This is both a limit case and a paradigm case from which we extracted the view on liberty proposed here.

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list (raising prices) in the market where it clearly has a structural monopoly. If anything, the prices in the market where it was dominant were lower than in the markets where it was competing. After Microsoft had come to dominate the PC market, it might have been expected to raise prices, but it lowered them dramatically. We can not attribute this result to some idiosyncratic difference between PC and Macintosh markets since Microsoft equalized the prices in the two markets after gaining dominance in both. What might be going on, then? One answer, that appears consistent with all our findings, is that Microsoft worries about competitors even when it has a very large market share. Such concern about potential entrants might explain why Microsoft has not lost any markets it has gained"<http://www.utdallas.edu/~liebowit/netpage.html>.
We have no competence to check the facts. Even if the authors had not got correctly the facts, the idea that it is important to pay attention to potential entrants is very significant. The existence of potential entrants is the element that really makes the difference, not the market share.

[37] You can join the vast network of users of open source programs, if you like one of those programs and if you are prepared to pay for the total cost of the operation (often these programs are like mathematical books – they presuppose that you have a background knowledge; if you lack this knowledge, then you need long hours of learning, books, a lot of practice and so on). For example, I edit this book with Vim and I typeset it with LaTeX; these are two famous open-source tools. It would make no sense however to argue that all the authors who edit and typeset their books with Word are making a bad mistake or are "the prisoners" of Microsoft. Many consumers, especially in the universities, use the open-source tools under a Microsoft operating system, thus combining all the elements that suit their tastes.

There is however a very well-known objection to the 'highly valued by the consumers' phrase. The argument says that, in the case of complex actions, individuals may become "path-dependent". Events that happened long ago shape their actions.[38]

The path-dependence argument has two parts. The first part is trivial, at least from the point of view of this book. As we have shown all the products of human action are, so to speak, "carved in a material that is accidental" and bear the mark of the accidental on them. It is no surprise that the QWERTY keyboard is such an accident.[39]

The non-trivial part of the argument is highly questionable from our point of view. If we translate it into the language of the network of agents, an implication of the argument is that agents have a limited horizon. Their connections are two few and prevent them from having a broader picture of the alternatives available.[40] This is a clear invitation for the planner to step in. The implicit presupposition is that the planner has a broader horizon and is able to assess the efficiency of actions in a better way.

There is in the whole argument a strong flavor of a *technological* view of efficiency. The idea is that the alternative to QWERTY led to world's records in speed typing. World records in speed are not however always tied to the best technological solutions for most consumers. A Formula 1 car is able to reach spectacular speeds, but it is created just for fun and would be of no use as an everyday car. First of all, they are too fragile for a normal car. But the real problem is different. Efficiency is indicated by the profit and losses on the market, not by external, pure technological considerations.

The discussion on path-dependence is closely related to a debate that is of a greater interest from the perspective of our definition of liberty: the debate on the effect of networks on consumers.

There are many meanings of the term "network". There is a more gen-

[38]In "Clio and the Economics of QWERTY", *American Economic Review* 75, no.2 (May 1985), Paul A. David writes that "A *path-dependent* sequence of economic changes is one of which important influences upon the eventual outcome can be exerted by temporally remote events, including happenings dominated by chance elements rather than systematic forces"(p.332).

[39]Paul A. David writes that "the dynamic process itself takes on an *essentially historical* character"*ibidem*. Obviously, physical laws are also important, in the case of such products, as well as the structure of the human body and of the human mind. This makes the proportion of the accidental features a question that has to be decided, as Paul A. David points out, an empirical issue.

[40]The competition is too limited and "in the absence of perfect future markets drove the industry into standardization *on the wrong system* — where decentralized decision making subsequently has sufficed to hold it"(Paul A. David, *Op.cit.*, p.336).

eral meaning: like in the case of a network of phone users (they are literally connected); or in the case of more elusive networks (without any kind of direct physical connection between the members). There are technical meanings, as in the case of a neural network.

Let us relax for a moment the conditions for the concept of network and use a more general meaning. From the perspective of the economist, there is a critical mass of the network. A network of two or three phones is a toy for kids, but when more and more consumers join the network the value of having a phone increases. But what happens if you joined a network that has the "wrong" technology? We are back to the problem of path-dependence.

Stan J. Liebowitz and Joseph Margolis made a useful distinction between three types o path-dependence. We will reformulate them a bit, assuming that a "path" is the path from one choice-point to another, i.e. from one state of the network to another. The first type of dependence starts with a choice and leads to a path that cannot be leaved without a cost. The second type of dependence introduces a more dramatic element: the chosen path is not the best (it is not optimal, if we compare it to other paths that were not correctly identified in the past). It is however costly to leave it and change the path. The third type of dependence is like the second, but the error can be rectified at a cost that would be covered by the benefits of the improved path.[41]

The third type of path dependence is clearly a problem for neoclassical economics. From a neoclassical perspective, individuals are rational and the market forces always push them toward the optimal solution. Is this a problem for a minimalist view on human action, like the one that we have tried to build here? Let us see what assumptions might be relaxed in the minimalist approach. The agents compute functions in order to activate a connection; but they might not be exactly the maximizers of the neoclassical model. The other solution would be to assume that their values have curious structures, but this is obviously *ad hoc*.On the other hand, we cannot abandon the role that money play in the model: to enable calculations of profit and losses. Therefore the third type of path dependence is a challenge for the minimalist model too.

We may speculate that the change connections and of the weights on connections is operated in a network of agents in a way that does not paral-

[41]Liebowitz and Margolis proposed these distinctions in "Path Dependence, Lock-in and History", a paper that can be accessed using N. Economides's *Bibliography on Network Economics* at <http://www.stern.nyu.edu/networks/biblio_hframe.html>.

lel exactly the neoclassical model. To put it more bluntly the neoclassical model is focused exclusively on the weights.[42] Let us say that two technologies are behind two types of connections *A* and *B*[43]. For a while, only connection of type *A* that are created in the network and weights are generated for this type of connection. After this, the technology behind *B*, if adopted, would yield a higher profit for the agents involved in its use. But there is obviously a problem in the generation of new connections.If there are few or no *B*-type connections in the network, then there is nothing to activate.

From the perspective of liberty, the real problem however is not to equate liberty and efficiency. Especially if we think about efficiency in pure technological way and if we do not take into account the agent's perspective or we try to make some global calculation of efficiency this equation is a non-sense.

What liberty offers is the *possibility* to calculate efficiency. This is only a possibility, not a necessary outcome. More than this, it is possibility for each agent who is computing her losses and profits in monetary terms. This is not a possibility for some authority that stands above the agents.

It does not make sense to try to save people from the grips of their own mistakes. Here the Popperian argument against *authority* is central. The nexus between networks of agents and efficient outcomes is an empirical one. If path dependence *is* showing something, then it is showing the role of historical, accidental factors in the path taken by complex human actions involving many agents. The solutions to empirical problems are fallible conjectures. There is no infallible authority.[44]

10.7 Markets, Minds, and Social Stability

Up to this point in the book, minds have played no role whatsoever in the webs of interactions or the networks of agents. We have examined models of minds, but this is a different story. It is the time for considering minds as elements that play a role in the evolution of

[42] We might translate in this way the algebra of W. Brian Arthur's "Competing Technologies, Increasing Returns, and Lock-In by Historical Events",*The Economic Journal* 99, no.394 (March 1989), pp.116–131.

[43] See the simple model in W. Brian Arthur, *Op.cit.*, p.119.

[44] The main weakness of the Austrian School is its inability to build layers of empirical theory around the *a priori* core. On the other hand, the weakness of the Popperian approach is the temptation to use piecemeal planning: a bit of piecemeal planning (a subvention or some regulation) would presumably push agents to technology *B* in the above example. Both weaknesses have to be overcome.

the network of agents. We examine an argument that is symmetric with path dependence: this time people are supposed to be on an optimal path, but they leave it deliberately and choose a non-optimal path.

Let us make an imaginary experiment. An individual *A* is on a boat in the open sea. A storm destroys the boat. The individual *A* saves his life and swims until an island. On the island there is just one individual *B* and a fountain. The fountain is the only source of drinkable water. The fountain is the private property of the individual *B*.[45] Should the individual *B* give water to *A*?[46]

There is no answer to the question from the point of view of the formal theory of action. This theory does not examine the "should" type of question.[47] If we eliminate "should" from the question, the answer is obviously "it depends". They might cooperate or they might not cooperate.

The point we want to stress is that minds matter. The beliefs of the individuals do matter in such cases. If *B* believes that he must help people in distress, then he will give water to *A*. If *B* believes that he must be the only one who drinks from the fountain, he will give no water to *A*.

From a purely formal point of view, the nature of the beliefs and their content does not matter. The individual *B* is just confronted with a set of opportunities. If we do not want to engage in an analysis of the mind of *B*, then all that matters is a model which captures the condition of *B*'s mind as a chooser.[48]

Let us discuss now a modified version of the thought experiment. This time, the island is inhabited by both *B* and *C*. *C* buys water from *B*, but thinks that the fountain should be common property. *B* and *C* have an unconstrained democracy and they use majority rule. Until the arrival of *A*, this has not meant very much, because there is a tie. But, if they vote again in the problem of the fountain, *A* has a decisive vote. What happens?

Again, from a formal point of view, the answer is is "it depends". *A* might strongly believe in private property. He would vote for private property even if *B* does not sell water to him. He would rather die than vote

[45] The institutional structure is part of the data of the problem.

[46] For the drinkable water problem see Nozick (1974, p.179). J.J. Thomson, "A Defense of Abortion", *Philosophy and Public Affairs* 1, no.1 (Fall 1971) discusses the imaginary case of a violinist whose survival depends on a direct connection to the body of another person.

[47] See Mises (1966, p.95) on the difference between ethics and the theory of human action.

[48] Our option is again for a stratified theory. In this case, a non-formal stratum of the theory is added to the basic formal layer.

against the rule of private property. On the other hand, he might think that some restrictions should apply and vote with *C*.

There is a strange feeling that the second version of the story is much more probable. Is there any non-empirical argument in favor of this feeling? Is it just possible to say that this is human nature?

The thought experiment is not a pure philosophical speculation. It is connected with a more profound problem. What is the attitude of human minds toward liberty?

The principle of liberty has rarely been accepted in its entirety. The consequences of the principle of liberty certainly look very curious for the sons and daughters of the twentieth century.[49]

A.V. Dicey and then Milton Friedman formulated an argument concerning the impact of public opinion on institutions. They observed how a change in public opinion had led to a rejection of the institutions of liberty.

Milton Friedman starts with the observation that "anything approaching a free society is an exceedingly rare event"[50]. What could be the explanation of this lack of stability of free societies? Milton Friedman quotes A.V. Dicey, who reverses the questions. Dicey shows that we are not asking the right question. The right question is how were people induced to accept individualism.

Accepting individualism, according to Dicey, is a very curious thing. "The argument for a free society" – according to the interpretation of Milton Friedman – "is a very subtle and sophisticated argument. At every point, it depends on the indirect rather than the direct effect of the policy followed"[51].

Milton Friedman then goes on and generalizes the argument in the case of every policy. He is basically arguing that all kinds of evils that arise in society tend to be treated by the public opinion from the point of view of piecemeal planning.[52]

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[49] Berlin (1969, p.7) notes the impact of the political movements hostile to liberty in the twentieth century: among other things, they advanced "the notion that answers to problems exist not in rational solutions, but in the removal of the problems themselves by means other than thought and argument". These means are the use of force and the inevitable outcome is the demise of liberty.

[50] Milton Friedman (1962, p.3). Indeed, if we take our definition of liberty in its strict sense there are only a few approximations of a free society.

[51] Milton Friedman (1962, p.3). As one can easily note, Friedman is stressing the *indirect* character of the argument in favor of individualism. He also presupposes that the argument is *consequentialist*. We have adopted in this book an indirect strategy that relies in the core of the theory on logical arguments, not on the analysis of the consequences of universal planning.

[52] "If you look at each evil as it arises, in and of itself, there will almost always tend

The argument that it is very difficult for the public opinion to accept individualism is the main piece in Milton Friedman's theory of the instability of a free society. He also adds a very important factor: the cycles of government corruption and lack of corruption. If the government is corrupted, then it is easier to convince people that *laisser-faire* is a better solution. But the minimal government that comes with *laisser-faire* tends to be very honest. If you don't have to sign many approvals, there are not many reasons for citizens to try to corrupt you. This leads to a new step in the cycle: people think that the best solution *is* a wider role for government, because it is not corrupted. They fail to see that the government is not corrupted because it had such few opportunities to be corrupted.[53]

What could change public opinion? Milton Friedman writes that he has nothing non-trivial to say on the respective topic, but he thinks that ideas can influence the public opinion. Public opinion drifts in a different direction if it is influenced by individualist ideas properly explained.[54]

Beyond the structure of the human mind and the influence of ideas upon it, is there any deeper presupposition that could explain the potential hostility of the public opinion toward individualism? This question is important. We will rephrase it a little and talk about minds, not about public opinion. We want to stick strictly to methodological individualism and stress the idea that public opinion is not a collective entity. Now the question is why there would be such a tendency of the minds?

We modify the network model in order to make explicitly room for minds. In the network model we add the assumption that the agents have minds. Liberty is already defined in the network model. We have to show that there is a tension between minds and liberty.

There is no need to examine mental contents in order to prove the existence of such a tension. We just have to examine carefully the status of the agents as choosers and the characterization of liberty. They tell us something about a formal problem, not a content-related problem. We have to

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to be strong pressures to do something about it. This will be so because the direct effects are clear and obvious while the indirect effects are remote and devious and because there tends to be a concentrated group of people who have strong interests in favor of a particular measure whereas the opponents, like the indirect effect of the measure are diffused"(Friedman 1962, p.4).

[53] See Milton Friedman (1962, pp.6–8). Milton Friedman uses the historical case of Great Britain for building this argument.

[54] A conclusion in the same vein has also Karen Vaughn (1984). She uses the same idea of the force of interest-groups that ask for piecemeal planning in their favor combined with the rational ignorance of the broad public opinion which is too dispersed to care for the minor losses that are generated by such interventions. She concludes too that ideas have an important role to play. On the role of ideas see also Gamble et al. (1989).

provide just one case in order to prove the existence of the tension.[55]

Let us think about the case of a group of individuals that we analyze according to the network model. Some of the members of the network have extraordinary talents. They make a lot of money.[56] The less talented members of the community have, according to the basic choice points model, scales of values. Where would be placed the presence in the network of the talented members on this scale? It does not make sense to say that it occupies a low position on the scale.[57]

Let us now, for the sake of the argument, admit that the talented members want to emigrate. They will join a network that has no ties with their present network. From the point of view of the non-talented people, it makes a lot of sense to block the departure of the talented people. For the non-talented people, the departure of the talented members of the community is a net loss.

Is it possible to generalize and show that we can construct a series of such cases? If this is true, then we prove the existence of a deep tension between minds and liberty.

The strategy of generalization is to replace "talented" with "lucky" or just "wealthy". We can now replicate the above argument for each case. The result is that it is efficient for the others to keep these people in the community.[58]

Let us now try to reverse the argument. Does it make sense to force people to perform some services? Of course, it does. Think about the thought experiment with the fountain. The service of selling water would raise the welfare of the others. This is obvious, since drinkable water is so scarce on the island. It is not important that people "need" or do not "need" water. The only significant factor is to have water in some high position on the scales of values of those who do not own the fountain.

This is a tension between minds and liberty. All it takes in order to unleash it is an unconstrained democracy.[59] We saw this in the second

[55] In order to prove that something has a given property you need one case. In order to refute an universal conjecture you also need one counter-example. Therefore, if we say that a certain tension exists in a situation, we mean only that this tension is possible.

[56] We must note the meaning of this fact in the model: there are a lot of agents who want their services; they have a lot of active connections and transfers of money, along these connections, make them rich.

[57] The others might envy the talented individuals, but their actions demonstrate something else. They pay for the services of the talented people. On the role of envy in society see Schoeck (1971).

[58] They use force, if "necessary", from the perspective of their calculations.

[59] "Unconstrained democracy" means here that the democracy has an unlimited agenda. The most important point is, of course, that voters can decide to take property from some

thought experiment with the fountain.[60]

members of their network, even if these persons are not aggressive or confront them with any kind of clear and present danger.

[60]The tension between minds and liberty can be proved formally, but it's just a possibility. Its actualization is a part of a historical experience that has to be studied empirically.

Part III

Transition to Liberty

Chapter 11

Absolute Liberty

The Objectives of Part Three The initial objective of this part of the book was to discuss transition in Eastern Europe from the point of view of liberty. This intention has faded gradually away.[1] The final part of this book has now a very different, theoretical ambition. Its main question is how far is it possible to roll back from planning. The planner model tells us that comprehensive universal planning of interactions is impossible. But full liberty is not the only alternative to universal planning. The other alternative is piecemeal-planning.[2]

[1]One should note that the subject of the transition to liberty is much wider than the transition in Eastern Europe. Another point is that the impact of the market itself on the transition to liberty has always been a topic of reflection. Mises writes that "the abolition of slavery and serfdom is to be attributed neither to the teachings of theologians and moralists nor to weakness or generosity on the part of the masters. There were among the teachers of religion and ethics as many eloquent defenders of bondage as opponents. Servile labor disappeared because it could not stand the competition of free labor; its unprofitability sealed its doom in the market economy"(Mises 1966, p.631). In a different context, all these elements reappeared in the historical experience of Eastern Europe in the last century.

[2]Ralf Dahrendorf in his *Reflections on the Revolution in Europe: in a letter intended to have been sent to a gentleman in Warsaw* (New York: Random House, 1990) formulates precisely this challenge. He contrasts Hayek and Popper. According to Dahrendorf, "though they seem siblings, they are in fact very different. Hayek has a fatal tendency to hold up another system against that of socialism. It is a passive system to be sure, but one complete in itself and intolerant of untidy realities;... Popper, on the contrary is a radical defender of liberty, of change without bloodshed, of trial and error, and also of an active march into the unknown, and thus of people who try to design their destiny"(p.29).
On one hand, Dahrendorf claims that Hayek has his own (unrealistic) global plan. On the other hand, he praises Popper for an approach based on trial and error. He warns that a "a detailed master plan of freedom" is a contradiction in terms that is likely to lead back to a close society (p.160). He regrets the "unfortunate connotations of social engineering", but thinks that "piecemeal" might not be appropriate for constitutional changes (p.161).

Finally, in order to have a complete indirect individualist argument it is not enough to rollback planning up to some level. We have to show that planning activity has a special connection with individual agents. The historical drama of Eastern Europe is only a background for such reflections and arguments.

In This Chapter We shall start with an examination of possible objections against full liberty. These objections are purely theoretical. They should be distinguished from the tension between minds and liberty. The respective tension can lead to institutional change, without any theoretical reflection.

11.1 The Problem of a Common Concern

The network model itself raises a problem. It is a model inspired by neural networks and multi-agent systems. Neural networks perform certain functions. They recognize letters in a picture. They learn words and so on. What does a network of interactions? What function performs the network of interactions?

The answer to the preceding question is complex common human action. Think about an worker who comes near present-day Cairo, four thousand years ago, and builds a very small pyramid. The worker went away. Thousands of workers camp in the same place for three decades. They develop a very complex web of interactions. They build a huge pyramid, with intricate structures. They go away too. The point of these examples is that in both cases what is achieved is a transformation of the environment.

On the other hand, the last example might be read in a very different way. The builders, one might say, have a common concern, namely the construction of the pyramid. Further, the idea of the common concern can be directed against absolute liberty. If everyone is entitled to join or not to join a network of interactions, then the result of that interaction does not reflect any common concern. Even whole societies have to provide a minimal common concern.[3]

His basic contrast is between a closed society and an open society. The open society is the solution with its rejection of a Great Planner and its clever use of piecemeal planning.

[3]This is the argument of Nozick in his book *The Examined Life*. He argues that if we look at government from the perspective of what we would call a formal grammar of action, then the system of liberty is the only one that makes sense and governments have

The advantage of the common concern formula is that it does not refer to some specific objective. It might be anything: the war against poverty, the concern for the environment or a statement of solidarity.[4] It is not necessary to discuss the merits of a concrete concern. We can concentrate upon the very idea of such a concern.

11.1.1 Common Concerns Place Restrictions on Liberty

A statement of solidarity would be an example of a minimal common concern. We will prove that this concern has an impact upon liberty.

The fact that the common concern affects liberty does not prove in itself anything. Maybe liberty needs some corrections or improvements. Liberty has been already defined in terms of rules and rules are constraints. The problem is that somebody might claim that the common concern does not curtail liberty. We have to prove that it does.

The case of the minimal common concern is the most challenging. Let us examine it. A statement has a meaning. In order to be understood, the meaning has to be shared by all the members of the community. Otherwise, the statement is not a common concern. As we have shown already, when we have discussed the possibility of a formal approach to action, individuals can interact without sharing a meaning.[5] The presupposition that they

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no purpose. However, if we look at government from the perspective of *meaning*, then things change. "Joint symbolical action does not merely symbolically express our ties of concern, it also *constitutes* a relational tie itself. The relational stance, in the political realm, leads us to want to express and instantiate ties of concern to our fellows. And if helping those in *need*, as compared to further bettering the situation of those already well off, counts as relationally more intense and enduring from *our* side and from the side of the receivers also, then the relational stance can explain what puzzles utilitarianism, *viz.*, why a concern for bettering others' situation concentrates especially upon the needy"(Robert Nozick, *The Examined Life: Philosophical Meditations* [New York: Simon & Schuster, 1989], p.288).

Nozick's break with the theory of *Anarchy, State, and Utopia* triggered a sad comment in Loren Lomasky's "Liberal Obituary?", *Liberty* 4, no.6 (July 1991), p.55, where he wrote that "a notable exponent of libertarianism recants". The article analyzes Gray's *Liberalisms*, another well-known "recantation". Of course, from an academic point of view, the recantations are less important; only arguments and evidence matter. Thus what we try to do here is not to take a "position" for or against the system of liberty, but to see which are its properties and how can we examine them.

[4]Nozick, *Op.cit.*, p.289, stresses however explicitly that the organizational counterpart of the concern cannot be a program supported by people's voluntary contributions.

[5]See the distinction between two types of interactions in 10.1. The interaction presupposed by the minimal common concern is of the first type, since it requires shared meanings.

share a meaning restricts further the possibility of entering into a network or simply establishing a new connection. Therefore it restricts liberty.

This kind of restriction of liberty is quite common. It is part of any requirement that some kind of community should be established, not a simple interaction.

The case of other common concerns is less subtle. Let us define a non-minimal common concern to be a concern that requires more than the understanding of a statement. The non-minimal concern requires action. It introduces forced interactions into the networks.

Typical examples of non-minimal concerns are of the type of the war against poverty. Actually, such a war presupposes redistributions. These redistributions are not voluntary and, therefore, they restrict liberty.[6]

Would it be possible to use liberty itself as a weapon against poverty? Practically it is possible, but there is no theoretical connection between liberty and what most people may consider to be wealth. Think at the case of the orthodox hermit who lived completely isolated, in a cave in the mountains.[7] Such a hermit was very poor according to common standards.[8] But his behavior was in full accord with the idea of liberty that we have proposed here. His only concern was to live a life full of meaning, a life that brings him closer to God. For him, interactions with other humans were obstacles on the path he has chosen in life. He severed all connection with men and women, as much as he could.

11.1.2 Erratic Interventions

A common concern entails always a web of sufficiently complex interactions. Suppose that I have a unique tree in my garden. I want to cut it, but a strong public campaign is launched against my plan. The admirers of the tree claim that the tree must be saved for future generations. But the tree is my property. They have to change the rules of property. The point is that they have to engage in a complex interaction.

If, in cases of the above type, making a simple exception modifies the rule, then this is nothing more than an arbitrary intervention. Why would this be less arbitrary then my decision to cut the tree? Obviously, it cannot

[6] They restrict *liberty*, not just the background freedom. If we conflate the two, then there is the vague sentiment that "freedom has to be restricted anyway in many situations". This is not the problem however; the problem is a change in the institutional arrangement of the system of liberty.

[7] The example is inspired by a real case. Anyway, it is consistent with Orthodox Christianity.

[8] Those used by the statistics of the war on poverty.

be. My decision was clearly within the limits of property rules, but these rules must be modified in a less arbitrary way.

The protection of the tree must be justified in a sophisticated way.[9] Those in favor of the tree must argue in favor of some common concern. Now, the question is what would count as solid argument in favor of the common concern? One has to show indeed that the concern has deep reasons.

Deep reasons mean that a much wider change is made in effect in the rules of property. For example, all kinds of unique objects will be put under protection. The problem is that such an interaction becomes more and more complex and leads to a destructive dilemma.

On the first horn of the dilemma, the road leads toward comprehensive universal planning of the web of interactions. Each class of cases is carefully regulated and rules are devised for the change of the rules themselves. Unfortunately, such a planning, as we saw in the second part of the book, is impossible. If it is reasonable, it is just incomplete.

On the second horn of the dilemma, no planning is attempted. A pragmatic approach is adopted. But in this case, the nature of the approach itself leads to incompleteness. There is, in principle, no attempt to be systematic.

The conclusion that follows from these observations is quite clear. The quest of the common concern leads to an erratic intervention. The selection of the cases is arbitrary. There cannot be any base for a common concern. All that can really exist is the concern of a group, a special-interest.Obviously, from a philosophical point of view, there is nothing that would make the interests of a group or an individual less arbitrary and more important than the concerns of others.

11.1.3 The Impossibility of a Coherent Official Concern

Would there be any change if the common concern becomes official. We may adopt a wide meaning of official. It is not necessarily the view adopted by a government. It might be an uncontested view in a community.

The problem of the official common concern is that it must be based on a doctrine. The doctrine, in its turn, as we saw above, must cope with a complex web of interactions. But the same argument that applies to planning is easily applied to the official doctrine.

Diversity and competition of ideas cannot be suppressed in a non-arbitrary manner. The problem is not that diversity and competition are

[9] Propaganda, from a theoretical point of view, is not enough.

more efficient. They are the natural outcome if the arbitrary does not reign.

Now we can draw the final conclusion concerning liberty and common concerns. The quest for common concerns cannot be logically consistent. They start from the claim that interactions are leading away from something that should concern everybody. They end up in an effort to take into account some particular concerns.

11.2 The Problem of Particular Concerns

It is now the time to consider the reciprocal of the problem of a common concern. The most widespread type of criticism against liberty is that it fosters marginalization. Individuals or whole groups are rejected by others. Few connections are established and no real network of interaction exists with this kind of people.[10]

The first observation is that this is indeed a distinguishing feature of liberty. Under the system of liberty it is quite normal to escape from a network or to refuse to engage in a systematic interaction with other individuals.

Why should the others be forced to cooperate? Are particular concerns in a better position than common concerns? There are many ways of arguing in favor of particular concerns. We will not concentrate on any of them. We discuss the abstract set of claims of a hypothetical particular concern.

Of course, the first thing that we must do is to circumvent a possible vicious circle. It makes no sense to say that the particular concerns have no valid claims because they infringe liberty. It is obvious that they limit liberty. As in the case of common concerns we have to concentrate upon the way of in which liberty is restricted and the consequences of this limitation.

The simplest form of the use of force for the promotion of a particular concern is a taking.[11] Somebody likes my laptop and thinks that it would be a better idea to play games than to write nonsense stuff about taking from others. He takes my laptop and plays games on it. I lose my text. My publisher loses the book. The readers also lose the possibility to buy the book and so on. Taking by force ruins the calculations of others.

The main argument against forcing people to take into account particular concerns is the destructive impact upon calculations.[12] The whole

[10] One of the particularly attractive features of the network model is that it can easily capture such situations.

[11] For takings on the basis of an official common concern see (Epstein 1985).

[12] In other words, this model stresses the significance of the *possibility conditions* of

network or web of networks is perturbed by this kind of use of force. The network as a calculation device is ruined by this kind of interventions. The effect is very similar to the chaos provoked by planning or interventionism based upon common concerns.

A possible objection to this argument might be that agents can include into their calculations the takings and the network will function anyway. While it is true that the network might function in some conditions, it is sure that misfunction will occur. If it were normal to integrate the particular concerns, this would have occurred without the use of force. On the other hand, at least some takings will occur in an erratic way, thus making calculations much more difficult.

The effect of forcing the network to take into account particular concerns is the misfunctioning of the network. The argument against the limitation of liberty has now a clear form.

If one tries to object and say that anticipations can alleviate the impact of the use of force this does not change very much the situation. Anticipations can do this. Practically, this is the way in which individuals cope with such phenomena. Let us think that a tyrant assumes power over a community. The other individuals have to anticipate the whims of the tyrant. Some of them survive. Some survive even quite well during the period of tyranny. The network of interactions however is misfunctioning.

The argument formulated above is much more clear if we take into account the weights of the connections. The interventions in the functioning of the network modify these weights too. Misfunctioning occurs even when no connections are introduced using force. It is sufficient to disturb the weights through some kind of manipulation.[13]

11.3 Limitation of Liberty: the Lack of Justification

It is possible now to formulate an intermediary conclusion. There is no justification for the restriction of liberty.

There are some interesting corollaries of this proof. Before going further we should stress that we worked with the network model. The use of this model is part of the strategy that we have called indirect individualism.

efficiency, but not on efficiency itself.

[13]Reading Rothbard, *What Has Government Done to Our Money?* (Auburn: Ludwig von Mises Institute, 1990) offers plenty of topics for reflection on the disturbances caused by manipulated money.

The first important corollary is that piecemeal-planning cannot be justified. It amounts to nothing more than an arbitrary intervention. Beside the benefits earned arbitrarily by some agents, it leads to misfunctions in a network of agents. It does not matter, from a theoretical point of view, if this disturbances are small or great. All that matters is that this type of planning can only serve special-interests. It is impossible to show philosophically that *this* interest is more "valuable" than *that* interest.

There is, no doubt, a difference between universal and piecemeal planning. Piecemeal planning is logically possible. The respective plans are consistent. It is not their inconsistence that leads to arbitrary, but the choices upon which the plan is based. In fact, they are like any other human plans; they do not reflect some higher concerns.

There is further a consequence that may seem very strange. Since there can be no common concern, liberty itself cannot be a common concern.[14] This is not a problem for the functioning of a network of agents. The network is not based upon some kind of common concern; it can function quite well without it. But it is a deep and disturbing problem from the point of view of the minds. Liberty cannot become the subject of a coherent ideology. This fuels further a deep tension between liberty and minds. Minds grasp easily ideologies, because they shortcut intricate arguments; they are mere propaganda for a certain *position.* But, in the case that liberty itself cannot be the "position" defended in the ideology, minds have further difficulties with it.

[14] Liberty can be a *concern*, but not a *common concern.* Therefore, logically, there is a diversity of modes of being concerned with liberty. Practically, this *is* the reality. See 15 for the quest of the shared *presuppositions* beyond this diversity. For some empirical data about this diversity and the shifts in its main currents see the "Liberty Poll" in *Liberty* (April 1999). The journal has a site <http://www.libertysoft.com/liberty/liberty.html> on which one can explore the poll and the numbers of the journal with comments on it.

Chapter 12

Liberty and Individuals

The previous chapter focuses on a negative argument. It tells as that liberty cannot be restricted in a consistent, non-arbitrary way. It tells us nothing about the positive side of liberty. What kinds of rules are consistent with liberty? The aim of this chapter is to discuss this type of rules and make a brief incursion into the problem of the recent transition to liberty in Eastern Europe.

12.1 Private Property

The rollback of universal planning led us into the chaos of various arbitrary plans. The hope that piecemeal planning offers some kind of coherence had to be abandoned. Piecemeal planning lost the radiant aura, but is still around, as good as any other form of consistent planning. We are going now to prove that it has a crucial drawback.

What is the methodology of piecemeal planning? First, a problem is identified. Let us say that this is the problem of poverty in society. Then a plan is designed. The plan is implemented. If errors appear, the plan is corrected and tried again and so on.

If we rephrase the whole problem in mathematical terms, *existence* is not a problem for piecemeal plans. Unlike universal plan, they exist as consistent plans. Mathematicians like to ask about the solutions to a problem another question too: is this solution unique? And why would it be unique?

Let us go back to the war on poverty. The curious presupposition that lies behind the war on poverty is the uniqueness of the plan that is supposed to fight poverty? Why try only one plan? The more we think about this

question, the more absurd seems to be the idea of a unique plan. Why not try many plans in parallel? After all, each individual affected by poverty might have his own plan. The answer is very simple: there is a monopoly behind all this; only state agencies are supposed to be able to wage the respective war. This is, by all means, an unsupported presupposition.

We should make now a digression. One should note that we are now using our indirect strategy. Usually, pointing to the direct individualist strategy and claiming that individuals are not able to get alone out of poverty seems to justify the war on poverty. We have no reason to consider this argument, because – for the moment – our problem is very different: we want to show that there is plenty of room for alternative plans.

Indeed, there is plenty of room for alternative plans. There is nothing in the nature of poverty that would prevent the existence of alternative plans. The same can be said about education, for example. Each alternative plan has its own contribution to the solution of the problem. To deny this means to return to the idea of a comprehensive plan and it would be easy to show that we can apply in this case the argument against planning that we have used in the first place. Anyway, there is not need for this. The very idea of piecemeal planning precludes this: there is no ambition in it to develop a comprehensive plan.

Let us suppose now that I live in a house and I plan to paint it in blue. There are other people who plan to paint it in red. Now, these plans are clearly incompatible. There is an obvious interference between them. We need a rule in order to decide who is going to paint the house. The role of the rule, for the moment, is to enable us to decide what plan is going to be the *unique* plan.

The problem of the unique plan can be raised in the case of non-physical objects too. Let us suppose that someone plans to take this book, erase my name, integrate it into a book that he has written, publish it and claim that he is the author of the whole book. I also plan to erase my name from its cover, but I want to sell it to someone who has a collection of unpublished anonymous books. The house cannot be, at the same moment in time, completely red and completely blue. Two copies of the same book can have different covers and different readers can use them, at the same time. Despite this difference, the example shows that two plans of using the same book[1] can be incompatible.

The incompatibility of the plans to use this book has no physical flavor.[2] The person who integrates this book into his book does not affect a

[1] This is strictly the same book, since I plan too to erase my name from the cover

[2] Steiner (1994, pp.35 ff) has a very useful concept of compossibility, but insists (too

physical object; he affects the connection between the person whose passion is to collect anonymous unpublished books and me. I claim that the book is unpublished, but this is not the case. Thus, either I give up my plan or the person who is going to publish my book gives up his plan. Again, there has to be a unique plan.

There is a final question now in this search for a consistent system of rules. Who is going to design the unique plans? The answer is clearly an agent. Let's call it a *private* agent. The rule that puts in correspondence bundles of possible unique plans and private agents is the rule of private property.

The rule of private property is incomplete if we stop here. The rule solves the problem of planning: who can plan what? But it is defective. If the agent is a collective agent, the rule must specify what happens if the agent breaks apart.[3] Thus, in the last instance, it must tie plans with individual agents.

The connection between individuals and the design of unique plans is especially important from the point of view of liberty. Only a rule of private property that ties individuals and unique plans is compatible with the idea of liberty. The argument is that this rule of property is necessary for the smooth creation and destruction of connections in the network of agents.

There are at least two compelling reasons for going to the level of individuals. The first is that some complex actions involve directly the body and the mind of the individual. It would be strictly impossible for someone else to plan the thoughts of another individual. The scale of values of the individual is inaccessible in this case.[4] Thus there is a bundle of such plans closely associated with each person. This is what has been called traditionally *selfownership*. The difference is that it is discovered at the end, not postulated from the beginning.

The second reason for the basic association of unique plans with individuals is linked with the concept of interference among plans.[5] Even intelligent people, when they are confronted with the notion of individual liberty formulated in the direct approach are horrified by the idea that in-

much, in our opinion) on the physical components of an action.

[3]Interesting situations can arise in connection with fragmentary actions. See on fragmentary action 3.5.3 here.

[4]Orwell's *1984* explores the efforts of Big Brother (the Great Planner) to control the minds. But the only way is to destroy the language, the culture and the minds themselves. Orwell is a bit obsessed with the horrible consequences of the attempt to plan the minds. In the daily reality of former communist countries, the whole enterprise had its ridiculous aspects too, because the communist propaganda was mainly laughable.

[5]See 10.5.1 here.

dividuals "may do what they wish". They might "hurt" other people. The objection is that all the discussion about "harming others" is rather unclear and *ad hoc*. Without it, direct individualism collapses. Indirect individualism has no need of such an *ad hoc* assumption. It is the logic of the rule of private property itself that precludes planning that interferes with the property of others.[6]

This is the final blow to piecemeal planning: it is exposed to a dilemma. If it interferes with the plans of some individuals, then it introduces an incoherence in the system, a situation in which incompatible plans are going to interfere. If it is absolutely coherent with individual plans, then it is redundant.[7]

12.2 The Formal Grammar of Action

This section is an interlude. It is a tale that sums up the merits of the formal approach and explores its relevance for what is going to come next: a discussion about agreements and the art of keeping plans compatible.

The tale might start with the traditional "once long ago". Once long ago there lived a family. The family received as gift a cat. They owned the

[6] It does not matter if you hurt them or not.

[7] The importance of individual plans is particularly stressed by Loren Lomasky. He uses what we have called a direct individualist methodology, i.e. he investigates in the beginning what are the characteristic features of individuals. Therefore he must use a salient feature of individual planning. He has to focus on something that is richer than our plan (stripped to its algorithmic structure). He writes that "Some ends are not once-and-for-all acknowledged and then realized through the successful completion of one particular action. Rather, they persist throughout large stretches of an individual's life and continue to elicit actions that establish a pattern coherent in virtue of the ends subserved. Those which reach indefinitely into the future, play a central role within the ongoing endeavors of the individual, and provide a significant degree of structural stability to an individual's life I call *projects*"(Lomasky 1987, p.26). Lomasky indicates Bernard Williams as the source of his concept of "project". Williams uses projects in the context of his critique of consequentialism, in "A Critique of Utilitarianism", the second essay in J.J.C. Smart and Bernard Williams, *Utilitarianism: For and Against* (Cambridge, England: Cambridge University Press, 1973). Williams has an wide concept of project. He discusses utilitarian agents and notes that such an agent "has the general project of bringing about maximally desirable outcomes"(*ibidem*, p.110). The outcomes are however the result of lower projects. Thus Williams introduces a hierarchy of types of projects. In the context of the present book, there is a problem with the project of bringing about maximal desirable outcomes. The problem is not the identification of the outcomes, but the fact that agent's budget, connections and monetary weights constitute a system of both pressures and incentives for acting in an utilitarian way. It is much more challenging to see how one could have another project than bringing about the maximal desirable outcomes.

cat, but they decided that inside the house the cat may behave according to the criterion of liberty.

What happened next? The cat is an independent and territorial animal. The cat began to explore the house. The cat did not speak, but it acted. Some members of the family talked about the consciousness of the cat. They looked for the meaning of the actions of the cat. Other human members of the family argued that the cat is a biological machine. It has no aims, its actions are devoid of meaning. Finally, they decided to bracket the question of the meaning of the actions of the cat. The family concluded that it is enough to observe the actions of the cat.

The actions of the cat demonstrated that it valued some zones in the house. It liked to sit in specific places. If there were objects in those places, it removed the objects with the paws. Some of these areas were cleared and reserved for the cat. But the doors of the wardrobe were firmly closed. Some other doors were closed too. But they built a nice ladder, since the cat liked to climb.

The cat did not talk; therefore one could not say that "they negotiated". The cat did not use money; therefore they did not haggle over a few dollars. But they reached an agreement. The cat was not aggressive. The family was not violent with the cat.

The moral of the tale is very simple. Why human beings, with their much more sophisticated ways of interaction, cannot reach such simple agreements? Maybe they should pay attention only to the actions and their own interests.

12.3 How to Cope with Complexity

We continue the interlude, but this time we are not telling a story. We sketch the methodological counterpart of the discussion on the criteria for rational rules.

If any sufficiently complex action is planned and behind each plan there is an idea, the algorithm, then looking at the methodology of the design of algorithms should be very instructive.

Let's come back to the planning center and look at its methodologies from the point of view of the design of algorithms. Anyone who has ever tried to write a complex computer program knows for sure one simple thing: one cannot write it as one big block with a lot of "from this line go to that line". This kind of program is logically possible, but we cannot cope with its complexity. Writing in this style is bound to end up with

spaghetti coding.[8] If the planners work with a more rational methodology they are decomposing the main task into modules. Each module is like a small plan and there is no labyrinth of go-to-instructions. Each module produces for a given input an output. Structures of such modules are then build according to the same principle of modularity.[9]

Later the methodology of the planning center may even abandon top-bottom planning. They are working now with something called "objects". Objects have properties, but also incorporate procedures. Objects send to each other messages. Their plans are now communities of objects.[10]

The planning center has become very sophisticated. It has discovered the value of "hiding the information". This is another important way of coping with complexity. Structures and procedures a hidden in objects or packages and are not visible for other objects or packages. This is a refinement of a technique that has long ago proved its efficiency, since variables are kept local as much as possible. Some process might change global variables erroneously. Local variables are shielded against unexpected intrusions.

Further, those of the planning center discover that even a computer program may behave in unexpected ways. The more complex it is, the more difficult it is to control all its aspects. They are also preoccupied by speed and an efficient organization of their computations and they discover the benefits of neural networks.

Now, one might say something like this: "the people at the planning center are clever; why aren't they giving up central planning for a system of liberty, if this is a much more efficient way of organizing computations"? They are indeed smart people. And I suspect that, among skilled programmers, one can find a higher percentage of libertarians than in the total population. Being smart in the design of algorithms is however not enough.

For making the final step toward the recognition of the rationality of

[8] "Spaghetti coding" suggests that the algorithm was designed so badly that nobody, even the author, is able to maintain it.

[9] I will refer to a book that betrays my age. It is a book on problem-solving and computer programming that I like very much, despite the fact that I have long ago abandoned any practical in interest in FORTH. FORTH is a computer language that incorporates a lot of elegant ideas; among other things it has an intense use for a structure called "stack" (the same that I have used in the value stack of an individual). The book is: Leo Brodie, *Thinking FORTH: A Language and Philosophy for Solving Problems* (Englewood Cliffs, N.J.: Prentice-Hall, 1984), especially pp.2–133.

[10] The metaphor "community of objects" is borrowed from Stephen Gilbert, Bill McCarty, *Object-Oriented Programming in Java* (Corte Madera,CA: Waite Group Press, 1997), pp.63–112.

a system of liberty one needs an adequate theory of human action. This theory has to include a choice-based approach to value and cost. It has also to reflect adequately the role of monetary prices. There are various reasons for which minds have enormous difficulties to accept such a theory of human action.

Indeed, if we add to the above methodological observations a theory of human action, the planning center becomes a redundant organization. This does not mean that the real transition to a system of liberty is a simple process; it is an intricate process. There is absolutely no necessity in this it. All that we can prove is the rationality of liberty, not that people are automatically fascinated by the idea of liberty as soon as they get in touch with it.

12.3.1 Property, Compensation, and Efficiency

What is the link now, at this stage in the argument, between private property and efficiency? The first new element, beyond the initial stage of the discussion[11]has been the introduction, in the second part, of the concept of monetary calculation (in the network of agents model). This is a restricted version of efficiency, since it does not involve collective efficiency.[12] The second new element is a concept of private property linked with individual plans.

The concept of private property, developed in this way, is not grounded on efficiency. It is based upon the idea of non-interference with individual plans. The reason for non-interference is the lack of supra-individual concerns that could guide supra-individual plans.

On the other hand, it is obvious that this way of conceiving private property creates the *possibility* of economic calculation. Thus it offers the conditions in which individuals may be efficient. In case of conflict, the problem that should first be examined is interference with individual plans, not efficiency.

There is, however, a problem. No plan of action can avoid completely interference with other plans of action. Let us say that I would like to avoid interference with all relevant plans of action when I am going to the University. There is absolutely no practical way of getting (in order to avoid collisions) the schedules of all the people that I am going to meet on

[11]For this stage see 3.4.2.

[12]The delicate part of the work is done by the notion of network of agents. It combines nicely interactions between the agents with calculation and yet it precludes a centralized form of calculation.

the street. If I insist too much, I will end up in the position of a central planner. The rules of property also are incomplete, for similar reasons.[13]

If I want to respect strictly the non-aggression axiom, then I have to be like the Orthodox hermit who avoided all contacts with other human beings. I have to live in a cave, in the mountains, and eat only what I can find there.

If I go on a sidewalk, I interfere with other pedestrians. The interference is negligible, but it is still real. If the interference is quite tangible, then we must *compensate* somehow the others. A polite gesture is absolutely sufficient in most cases.[14] A more complex procedure of compensation would entail more complex plans and we would have to contemplate the cost of these plans.[15]

Compensations are conspicuous in cases of more substantial interferences. If I have break a window, I have to pay or put it back. Many other examples can be readily produced. The general idea is that we plan and start acting; if we interfere with others, then we have to compensate them.[16]

The following step is to observe that compensations must be *calculated.* Calculations create a space in which the concept of efficiency makes sense. Even with a restricted version of efficiency we can recuperate the law and economics approach in its essential part.

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[13] See 10.3.1 here.

[14] James Buchanan writes about a rule of mutual toleration that is at work in everyday interactions. “Men and women manage to walk along city pavements. With rare exceptions, they respect queues in supermarkets, in banks, and in airports. There does exist a sense of ordinary respect for his fellow man in the ingrained habit pattern of the average American. This can be observed empirically all around us. Whether this reflects a heritage of Christian or Kantian ethics that were once explicitly taught or whether such habit patterns are even more basic to the human psyche, their existence cannot be denied. The ominous threat posed by the 1960s was the potential erosion of these habit patterns. If Americans lose mutual tolerance for each other; if they do not continue to accept ‘live and let live’ precepts for many of their social interactions independently of governmentally determined coercive rules, the area of civilized life that is both anarchistic and orderly must shrink, with untold consequences in human suffering. ”(Buchanan 1975, p.5). The problem is that, from this perspective, in more complex cases we have to look for a principle of “order” elsewhere.

[15] These costs are related to the famous transaction costs of Ronald Coase. On their reconstruction in the language of plans see 13.5.1.

[16] Randy Barnett built a whole theory of justice around the notion of *restitution.* “The *right of restitution* specifies that one who violates the rights that define justice must compensate the victim of the rights violation for the harm caused by the injustice”(Barnett 1998, p.159).

12.4 The Web of Agreements

The result of our rollback of the Great Plan can be summarized in a few words: if the individuals want to design complex plans, involving many of them, they have to make compatible the underlying unique individual plans. In other words, they have to reach an agreement.

Complex agreements entail a rearrangement of the connections among agents. Joining a network means that a number of connections with agents that are already in the network are established. There is here a dilemma. Does this require the agreement of all the agents that are involved in the network? If the network is very complex, this will just make agreement almost impossible.[17] The rule must be that you have to get the agreement of the agent or agents with which the new agent is directly connected. They form a cluster in the network.[18] If the rule asked for the agreement of all the members of the network, this would be a clear step into collectivism.

What happens if some agent does not want anymore to be involved with the network or a cluster of agents in the network? This is the other side of liberty. The agent disconnects herself from the network. Is there any agreement needed now? No, just the fulfillment of any obligations entailed by previous agreements. Liberty cannot imply irresponsibility. But it cannot also imply collective control. This would be a form of planning by some group of the actions of other individuals, since they decide the course of action of those individuals.

Now we are heading straight into one of those difficulties raised by reflexivity. They are familiar to philosophers in many areas.[19] What happens if reflexive agreements are involved? For example, what would be the effect of an agreement stating that no further agreements may cancel the respective agreement? Insoluble marriage or voluntary slavery are among the most conspicuous examples of such reflexive agreements.

A possible solution is to eliminate reflexivity.[20] The disadvantage of

[17] Holdouts would block agreements.

[18] Clusters of customers are naturally generated on markets. This process has been compared sometimes with voting: consumers vote for products. The producers "needs" a series of votes in order to survive.

[19] The liar paradox is the classical example of the role that reflexivity plays in philosophical analysis. See Vann McGee, "Semantic Paradoxes and the Theory of Truth" in (Craig and Floridi 1998).

[20] Bertrand Russell proposed a theory of types: the theory introduces different levels; at each level there is a certain type of entities. The theory eliminates the liar and related paradoxes because they use properties that belong to a higher level as if they belonged to an inferior level. See Nino B. Cocchiarella, "Theory of types" in (Craig and Floridi 1998). The later distinction between language and layers of metalanguages is based on

this type of solution is that it cuts too much. It makes a lot of sense to put into an agreement some clauses that refer to the agreement itself.

It seems to us that the most plausible solution is a requirement of locality. It might be difficult to formulate it in precise terms, but here we can see the disadvantages of natural language. Thus we will rely only on our individualistic intuitions. They suggest us that the agreement must not concern the whole network or all its possible states. It must be stated in local terms. It cannot be for all possible situations and forever.[21]

An implicit or explicit expiration clause is quite a natural requirement. The sunset clause will tell both parties how they should proceed in the situation in which one side wants to cut its connections.

A very unexpected consequence of this approach to reflexivity is a clarification of the role of property. Let us discuss an imaginary experiment that is very easy to visualize. Suppose that I want to get out of home. There are a lot of people around. A lot of connections are immediately established, because they all can see me. Should they ask for permission to look at me or should I reach any kind of agreement with them? This is impossible. Somebody has to decide. Again, it is obvious that the decision must be mine. I own myself and let the others see me when I get out. The very idea of locality strengthens this view of property.

Repeat the experiment now and change the problem a bit. The question is what kind of clothes should I ware. The answer is the same. I am the one who decides.

There is a slippery slope in this argument. Let us change the experiment again. This time it is not about me. The person who is exiting from the house is a breath-taking beautiful lady. And she decides to wear no clothes at all. If we want to remain consistent, the answer is that she is the person who takes the decision.[22]

The intuition behind this approach is now clear. This intuition is very important in the general case. First, agreements are actually possible if there are private property rules. Otherwise, it is not clear which are the

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the same kind of intuition: truth, for example, cannot be defined in language.

[21] Even institutions that have a clear collectivistic flavor could be nearer individualistic standards if the locality condition had been taken into account. Jan Narveson has a nice example of such a transition in the case of zoning committees and the like. For Narveson, individuals are *centers of experience*. The peripheries of these centers are more or less overlapping. Zoning committees should take into account the areas of local, dense overlapping. "The largest input should come from the people already in the zone in question, with accommodation for advice from areas farther away"(Narveson 1997, 306).

[22] This means, of course, that she is the person who makes this unique plan. The rules of private property show that it is her choice to wear or not to wear clothes.

sides of the agreement and which is the object of their agreement. We go back to the inconsistencies of piecemeal planning. Second, property should be localized. This means that collective property is either not functional or the real decisions are taken by some individual.

Another observation should be added to the discussion. Weights and activations are very important in the network of agents model. If I go out of my home, the weights on the connections with other agents are probably, in some cultures, insignificant. But the model is able to capture various situations.

The direct and the indirect approach to individualism are in sharp contrast at this point. Direct individualism starts with an assumption of self-ownership.Indirect individualism studies the connections between individuals and the rules that govern the formation of these connections. If we accept the idea that the rules must be applicable in a coherent and effective way, then we get to self-ownership.

Direct individualism is forced to adopt a series of strong assumptions concerning the cognitive abilities of the individuals.Indirect individualism stresses the local character of all computations and agreements. There is no need for great cognitive capacities in this case. In fact, quite simple computations must be performed. The network is taking care of the rest and performs calculations that cannot be performed by any of its elements.

12.5 The Fragility of Tyranny

From a theoretical point of view, it is now interesting to test if it is possible to exploit the models of human actions and interactions in the explanation of historical phenomena.[23] First, we will suppose that the tyrant wants to be extremely coherent and to plan absolutely everything according to a unitary conception.

The impossibility of planning shows us that such a tyranny is not possible. If we replace the impersonal planning center that we discussed in conjunction with the second model with a tyrant, then the result is the same. The tyrant, because he is a tyrant, has to become arbitrary and inconsistent in his behavior.

The tyrant, if we think in the terms of the network model, tries to direct the network through some kind of hierarchical structure, to control all the connections and the topology of the network. Because of the impossibility

[23] We are now probing our way beyond the *a priori* core of the theory of human action. We want to see how looks the empirical corolla around the core.

theorem, the success is bound to be partial. A hierarchical structure, even a partial one, requires large calculation capacities. The tyrant has to replace the calculations of the network.

As it gets stronger, the tyranny is more and more fragile. The algorithmic knowledge that is necessary becomes too complex and practically inaccessible.

On the other hand, the knowledge distributed in the network is useless for the tyrant. The weights of the connections do not mean anything if they are centralized. They are of no use to the tyrant because he is using the model with a central computation unit and needs a different type of knowledge.[24]

Now, let us reverse the famous problem of benevolence. Instead of the usual assumption that the tyrant is benevolent with his subject, we adopt the assumption that the subjects are very benevolent with him. They want to help the tyrant and tell to the center everything they know. The knowledge, despite its centralization, is useless because of the difference of type.

The argument of Mises against planning captured the problem, in a very adequate way. From the point of view of the theoretical approach adopted here, the network of agents uses market prices, if it is really complex. The planner does not use market prices.

There are some escape strategies for the tyrant. His bureaucrats might be encouraged to work as if they were on a market.[25]As Mises rightly pointed out this approach is very doubtful. The institution of property is bound to be destroyed by this approach and the "as if" does not work. In our terminology, we would say that the locality feature of the property is affected.

Summing up, a great concentration of power creates the premises for a Big Bang. After this initial explosion, individuals are released and may for a system of liberty. From a theoretical point of view, this system has, compared to planning, the advantage of coherence.

The Big Bang of the system of tyranny resembles the collapse of communism in Eastern Europe[26], almost a decade ago. Things do not however seem to happen as in the theoretical model. The rollback of communism is partial. The real empirical systems are rather far away from a system of liberty.

Before we go on, we should answer to some possible objections. The

[24]The type incompatibility offers a further argument for the impossibility of central planning.

[25]This would be a generalization of market socialism.

[26]For a short chronology of the events see (Dorn 1991, p.178).

simplest objection concerns the lack of predictive power of the network of agents model. The answer is that, as we have already stressed, the model is used in the kernel of the theory of human action. In its basic form it has no predictive power; it is a logical machinery. The only thing that it illuminates are possibility conditions for different kinds of action. In an extended form, it facilitates simulations of interactions. But, in order to explain or predict something, the kernel has to be extended with layers of empirical theory.

From a philosophical point of view, our main interest was, of course, for the possibility conditions.

12.6 The Collapse of Socialism in Eastern Europe

The best recent illustration of the fragility of tyranny is the collapse of the power of communist tyrants in Eastern Europe. The phrase "communist tyrants" is adequate. The general secretaries had tyrannical powers. The Party was a hierarchy of henchmen and it is confusing to speak about the power of the "communist party".

The tyranny exhibited the distinctive features that a theoretical approach would predict. When the tyrant tried to centralize everything there were enormous calculation problems.

When the tyrant used a more decentralized approach, the lack of an adequate structure of the institution of property was the main problem. Either way it was impossible to solve what Mises has called the calculation problem.

There was also in the minds of the individuals the consciousness of the fragility of the system. This consciousness was quite vivid, but it is difficult to document it in a systematic way. Because at that time it was impossible to collect systematically data that could corroborate this affirmation, the evidence is bound to be anecdotal.[27]

[27]The signs were quite visible. My own life experience tells me that. Despite of their obvious anecdotal character, the following two stories are significant. First, when I finished the high school, my history teacher advised me not to study philosophy. He had the conviction that philosophy was too closely associated with the communist system and the system is bound to end at some point in time. His question had a very practical nature: what I am going to do *then*? At that time I did not understand the premonition of the teacher. After a decade, I reached my own theoretical conclusion that the system is logically inconsistent and must collapse at the first gross blunder of its master. I also had enough knowledge of the people's potential fury. I had an auxiliary job at the main

12.7 Institutions and Minds

A network structure, if it has functioned a sufficiently long time, is very complex. It has many layers and a rich web of connections. Various weights of the connections have been stabilized and property rules are clear.

The second crucial fact of the network model is the lack of explicit programming of the network. Explicit algorithmic knowledge plays a very different role in the network of agents model. To put it in terms familiar to social scientists, the network is not planned or organized in a deliberate way.

The two properties of the networks that we have mentioned above are extremely important after the fall of the tyrannical center. After the collapse of hierarchical structures, the network structures are not rich. And any effort to *organize* the network makes no sense.[28] It would simply be a disguised return to the hierarchical structures and the command center.

Despite the abstract form that we have used, it is easy to see that this was, for example, the situation of Eastern Europe in 1989. The problem the new governments had in mind was how to stimulate the growth of a complex and functional networks of agents.

The strategy that was very popular in the beginning could be formulated in our terms in the following way: In order to function adequately, the network has to find new weights for the connections. Basically, this meant that prices had to be freed. Probably, the strategy also had a presupposition that prices send signals and everything is going to work after the reform of the prices.[29]

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think tank of the Party. I clearly remember that I thought that I must leave the think tank. Nobody is going to make fine distinctions between the auxiliary personnel and the others during the day of collapse. I took another job. It was a decision that was strongly colored by the feeling that the system is intrinsically fragile.

[28] It means nothing more and nothing less than that government has again resorted to planning.

[29] The main source of inspiration for this type of reform was the transition in Germany after the Second World War. Stokes (1965, p.31) emphasizes the role of the views of men like Erhard and Röpke. Stokes argues that the policies of the of the Allied Military Government were crippling the German markets: "Although the United States government spent billions of dollars in Germany, policies of rationing, price control, centralized direction, restriction and restraint — coupled with a failure to stabilize the monetary situation and manage the inflation — resulted in a virtually stagnated economy"(Stokes 1965, p.32). The key components of Erhard's reform were a monetary reform and the removal of price controls and the regulations that stifled the markets. Stokes underlines the immediate benefits of the reform. In the final part of his article he is resolutely stressing the role of ideas: "It is the attitudes and values which individuals hold and cherish which de-

New weights on the connections presuppose however that agents have to agree to establish new connections. Property rules should indicate with whom one has to negotiate what. Property rules were very problematic in Eastern Europe.[30] Even more deficient was the enforcement of these rules.

The claim was then that transition requires an institutional approach. New rules had to be adopted and enforced. The idea that new institutions have to be adopted during a transition period is not new at all. During the nineteenth century Romania was modernized and Western institutions were adopted.[31] The institutional change led to a famous debate concerning the

termine the character of a state, regardless of the forms, structures, laws, or constitutions which may in force at any given time"(Stokes 1965, p.37).

Svetozar Pejovich has recently compared the German and the East Bloc reforms. He uses a framework for analysis with three components: the rule of law, the carriers of institutional restructuring, the old ethos. He reaches the conclusion that, in West Germany, the rule of law had been favored by roots in the Weimar Republic, control by Western powers and denazification; Erhard, the main carrier of institutional restructuring opposed Galbraith's plannism; but informal rules were collectivistic. In contrast, in the East Bloc, most countries lack a genuine rule of law; the communist elite plays a key role; the old ethos is resolutely collectivistic. The transition to capitalism is highly uncertain. See (Pejovich 2001b).

Another recent study (Reichel 2002) compares the evidence in favor of two alternative hypotheses: the role of liberal reform and the reconstruction boom. He reaches the conclusion that the growth was significantly higher than the prediction of a pure reconstruction model. The reform did play a key role. Reichel (2002, p.436) also emphasizes the adverse effects of the dismantling the Erhard system in the 1970's. It might be interesting to note that the East Bloc, if it looks toward Germany today, then it looks to the modified system of a market economy, not to the model that was successful in the 1950's.

[30]One should make a careful distinction between privatization and the institution of property. Privatization may take place even on a large scale, despite the absence of the *rules* that make up the institution of private property. The most striking example in the past is the former Soviet Union itself. During the NEP private businesses literally saved the country. But the institution of private property was virtually non-existent. The NEP was, for the government, a shrewd strategy that paved the way for "another road to socialism"(Heller and Nekrich 1986, p.116). The new capitalists of the NEP "owed their existence to a policy reversal by the Soviet government, and they understood that at any time a change of policy could sign their death warrant"(Heller and Nekrich 1986, p.168). A death warrant is rather improbable today, but new regulations and taxes are probable and they do maintain in an uncertain condition the rules of private property.

[31]The best description of the Western influence on Romanian institutions is still the book of Alexandre Tilman-Timon, *Les influences étrangères sur le droit constitutionnel roumain* [The Foreign Influences on the Romanian Constitutional Law] (Paris, Bucharest: Sirey, Delafras, 1946). Tilman-Timon published also *Les actes constitutionnels en Roumanie de 1938 à 1944* [Romanian Constitutional Law from 1938 to 1944] (Bucharest: Delafras, 1947). The pages that are especially relevant here are from the first book and concern the Romanian constitution of 1866 (Tilman-Timon, *Les influences*, pp.317–336). The basic source of this constitution was the Belgian constitution of 1831. Tilman-Timon

gap between institutions and minds.[32]

Traditionally, the problem is phrased in a non-formal way. There is an alleged gap between forms without content (the institutions transplanted from the West) and the local culture. The idea however is that people cannot grasp the rules on spot. They act according to their habits. The effect is that people follow informal rules and ignore the official rules.[33]

In our own terms, we would prefer to talk about a gap between institutions and minds. It is better to keep the whole discussion at an abstract and formal level.[34] If we talk about culture, than we have to take meanings into account and leave the framework of the formal discussion. If we talk minds, we have only to analyze the kind of computations that they have to perform, but not their content.

Presumably, the argument is that minds have considerable difficulties when they have to follow new and complex rules. The cognitive abilities of minds are limited; therefore they turn back to what they already know. Formulated in this way, the argument resembles strikingly to arguments against direct individualism.

There is however a gap under the gap argument. The argument pre-

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compared the articles of the two constitutions and claimed that this was not a simple imitation, but contained elements of previous institutions. He agrees however that Belgian and French influences shaped the Romanian constitution of 1866 (*ibidem*, p.329). Among the "local adaptations" was an article depriving Jewish persons of Romanian citizenship. This article was not repelled completely until 1918-1920. On the history of the Jewish population in Romania, during that period, see Carol Iancu, *Les Juifs en Roumanie 1866–1919: de l'exclusion à l'émancipation* [Jewish Persons in Romania 1866–1919: from Exclusion to Emancipation] (Éditions de l'Université de Provence, 1978). Beyond the constitutional issues, a plausible hypothesis is that a the attitude toward the Jewish persons reflects an anti-capitalist mentality. This connection between anti-semitism and anti-capitalism was not specific to Romania. It can be documented throughout the whole Eastern Europe. In these conditions, the Romanian constitution of 1866, on one hand, supported unconditionally the institution of private property, but on the other hand reflected an anti-free-market mentality.

[32]Literally, the Romanian terminology was "forms without content". The critics of the institutional change argued that it was rash and brought only the form, not the content. The new institutions were empty forms. This position was defended, among others, by Titu Maiorescu, professor of philosophy, rector of the University of Bucharest, conservative politician and prime-minister of Romania.

[33]The Romanian constitution of 1866 was criticized by king Carol I himself, who claimed that Romania had jumped without any transition from "a despotic regime to the most liberal constitution"(quoted in Tilman-Timon, *Les influences*, p.335). The historian Iorga argued that it has absolutely no connection with the past (*ibidem*). The idea of the critics was that a capitalist political system has been created, but without a real class of capitalists – forms have been introduced, but there was no content (*ibidem*, p.336).

[34]In this case, the historical observations are merely illustrations of a situation.

supposes something very important, namely that the new rules that have to be learned are very complex. This presupposition has to be analyzed critically.

The rules that agents have to follow in a network are simple. We have talked before about the local character of the computations. Rephrased in a social context, this means that individuals involved in a network of interactions apply simple rules and have no need to know whole complexes of rules. For an individual there are a few simple rules for monetary calculation and the rules of property applicable around her. An individual has no need to know the whole complex of the rules of property.

In the conditions of liberty no one has to learn terribly complex rules. There are no agents with special centralizing roles.

The real gist of the gap argument is that the ruling elites have to learn new and complex rules. The elite is in difficulty.[35] But the very existence of a ruling elite entails the conclusion that hierarchical structures are maintained. They are superimposed on networks and lead to inextricable problems.

This is a different story. It is a story about a society that is not that much engaged in a transition to liberty as the official claim might be. What we have to investigate in reality are the reasons for the rejection of liberty. The gap claim as such does not make much sense. It fails to see the real problem: the lack of transition to liberty.

The "forms without content" argument, repeated today in an institutionalist language distorts the real phenomenon that it pretends to criticize. If we take into account that institutions are rules that constrain interactions, then in the network of agents model these constraints take the form of constraints applied to connections. Some *types* of connections are barred or dismantled and victims of illicit actions and transfers are compensated. There is however an enormous problem here: how are going the *types* of

[35]The phenomenon repeated itself in the case of the communist ruling elite. Milton Friedman wonderfully describes the mental cramps of the communist elite confronted with the working of the markets. Milton and Rose Friedman paid a visit to China and were received by a deputy minister. The deputy minister was going shortly to pay a visit to US to learn about the American economy. During the discussion with Milton Friedman he asked 'Who in the US is in charge of materials distribution?'; Milton Friedman commented in the following way this question: "I doubt that any resident of the United States, however unsophisticated about economics, would even think of asking such a question. Yet it was entirely natural for a citizen of a command economy to ask such a question. He is accustomed to a situation in which somebody decides who gets what from whom, whether that be who gets what materials from whom or who gets what wages from whom"[Milton Friedman, "Using the Market for Social Development" in (Dorn and Xi 1989, p.3)].

connections identified? This is not the problem of the usual agents, but of the elite we were discussing above. If some cases that belong to a type of connections are identified and others are not, then the result is far from the rule of law; it is arbitrariness. The problem is not that the form is empty. It is its arbitrary distortion.

Chapter 13

Incentive Structures

The picture of the transition looks rather grim now. The strategies that we have discussed so far are deficient and the recent example of Eastern Europe suggests that they fail. We will attempt now to draw attention to another aspect of the network model. The objective is to show how the network model can be used as an explanation of incentive structures.[1]

13.1 Decentralization Is Not Enough

According to a common practice we will call the former social systems of Eastern Europe communist. This does not mean that we try to point to some deep theoretic meanings. It just points out that in those systems there was a hierarchical organization, called the "Communist Party", that monopolized all power.[2] From our point of view, the most significant thing is that it *attempted* to plan the whole economic and social life. We stress the word "attempted", because, as we have already shown, planning in the

[1] Enrico Colombatto called our attention to the role of incentive structures in transition. He writes that "...from an Austrian perspective the features of the optimum – i.e. desirable – institutional arrangement(s) have no relevance at all, since the presence of substantial transaction costs makes sure that such an optimum state will never be reached. By contrast, the incentive structure is much more important, for it determines the economic and institutional dynamics of the country, irrespective of whether the outcome is desirable or not. Hence, the important question to debate is no more whether transition is successful and how long it takes for it to be successful; but whether the change in the incentive structure evolves continuously, or just in the presence of significant shocks"(Colombatto 2002, p.3).

[2] The best illustration of the consequences of this monopolization of power is probably Robert Conquest's *The Great Terror: Stalin's Purges of the Thirties* (New York, 1973).

full sense of the word is impossible. But nothing can prevent people from trying to do impossible things.

At least in some of its phases, the communist system was extremely centralized. For a while, it was centralized at the international level. Then it was mainly centralization at the national level. For example, the communist system in Romania, after 1964, stressed centralization at the national level.[3]

Centralization was such a conspicuous feature that it caught a lot of attention in and out of the communist system. It is possible to see centralization as the root of all evils in the communist system.

If centralization is the main problem, then decentralization and democracy seem to be the natural cure of this evil.[4]We will attempt to show briefly

[3]Robert R. King, *A History of the Romanian Communist Party* (Stanford: Hoover Institution Press, 1980) shows that "The Romanian Communist Party has evolved from a minor political movement serving external interests and having few indigenous roots to the dominant political institution in Romania. This evolution is unique among the East European states". Daniel Chirot, "Social Change in Communist Romania", *Social Forces* 57, no.2 (December 1978) is a short, but instructive overview of the evolution of Romanian communism. Chirot argued that Ceuaşescu's communism was close to the corporatist ideals of the Romanian right-wing nationalists of the 1930s. "Corporations were to be vertical organizations. The various key industrial sectors were to constitute corporations, but they would avoid horizontal, class-based solidarities. Workers and managers would be in the same, not distinct, corporate bodies.The military, the educational establishment, agriculturalists, merchants, artists and so on, would form corporations, with functional and regional subsections, of course, but without setting rich against poor or superiors against subordinates. On top of the structure, there would be the nation, the supreme corporate body, that would 'organically' integrate the lesser bodies"(p.493). This corporatist ideal was combined with communist structures. "In Romania, there is at the top a coordinating corporation consisting of its own functionaries and representatives of the other functionally defined corporate groups, the Party...But similar, if less privileged, versions exist at every level. University professors (including graduate students) have their own corporate institutions, as do writers, artists, journalists, youths, collective farm members..."(p.494). At higher levels, notes Chirot, these corporations resemble medieval guilds. The Romanian Academy, for example, is such a guild with its fine restaurant and privileges. Competition among such corporate groups is constant, as they fight for a larger share of the budget. Chirot describes, in 1978, quite perceptively, the conflict between Ceauşcu, the old-fashioned, uneducated apparatchik, and Ion Iliescu, the young, educated technocrat. In 1978, notes Chirot, "Ceauşescu is now as powerful in Romania as Stalin was in the U.S.S.R., a position unique in Eastern Europe"(p.495). His fall in 1989 was also unique. He was executed. Ion Iliescu came to power.

[4]Writing in 1974, Kenneth J. Arrow still thought that "with the development of mathematical programming and high-speed computers, the centralized alternative no longer appears preposterous. After all, it would appear that one could mimic the workings of a decentralized system by an appropriately chosen centralized algorithm"(Kenneth J. Arrow,"Limited Knowledge and Economic Analysis," *The American Economic Review* 64,

that this is an illusion.

Our argument against the view that decentralization solves the problems of communism is based on the approach to planning that we have adopted here. We have discussed about planning a web of interactions, not a society. What may seem a technical detail is very important from a theoretical point of view. Decentralization in itself brings nothing new if the resulting structures are also managed in the same fashion as the old structures.

The basic idea is that something else must happen in order to cure the evil. Property rules rather than centralization itself were the problem. Centralization was just an expression of a certain type of property rules. They were the problem.

A radical change in property rules combined with a monopoly of power by the communist party was not envisaged in Eastern Europe.[5] Even after the fall of communism, in Eastern Europe, as we saw already, it was very difficult to change the institution of property.

13.2 From Piecemeal Planning to Piecemeal Planning

From a theoretical point of view, the focus on centralization is generated by the presupposition that planning is *practically* impossible; it is practically impossible because the center has not enough knowledge. The logical consequence of this position is to look for some decentralized or polycentric solution.

What happens if we look at the whole problem from the perspective of the *logical* impossibility of planning. The planning is not impossible because the center is unique. Even a hierarchy of centers would not solve the problem. A *universal* plan is impossible.

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no.1 [March 1974], p.5). Arrow saw the limitations in knowledge as being generated by the absence of a market on which future supply and future demand to be equated. He thought that futures markets balance present commitments to the future. Future prices are not known.

[5]China took a different road. But, as Edward H. Crane wrote at the end of the 1980s, "China's leaders still face the problem of resolving the contradictions inherent in trying to achieve a market system without at the same time providing the institutional framework for markets to effectively function – namely, private property, freedom of contract, and constitutional safeguards for the rights of persons and property"[Foreword to (Dorn and Xi 1989, pp.ix-x)].

13.2.1 Total Planning Was An Illusion

Total planning was an illusion. There is no universal solution. In this situation, however, the natural question concerns what the planners really did during the communist era.[6]

The answer that the planners used the prices from capitalist markets and solved in this way their equations is not a relevant answer to our question. The question is about the *universality* of the plan. From this perspective, it does not matter that much where from they got their prices; we have to find out for what kind of plans they used those prices.

The answer is quite surprising but follows logically from the impossibility of planning: the planning during the communist era was piecemeal planning. It is impossible to do anything else.

It is difficult to perceive that it was piecemeal planning because we associate it with interventions on a market. The communist society was hierarchical and corporatist.[7] Markets were not conspicuous and all the time the top of the hierarchy had some plan to fulfill. But all they did was patchwork on a larger scale.

There was a name in the newspeak of the party for piecemeal planning: *campaign*.This term has a different meaning than the normal word 'campaign' in English. In the documents of the party the term was not used very often and, when it appeared, it was in auto-critical remarks. The idea was that it is a bad habit to work in this manner.

The idea of 'campaign' was so incompatible with a wise, well-balanced plan that it hardly could have a prominent place in the party's newspeak. But there were campaigns all the time. Some of them looked as if they were part of the plan. In the autumn, the "agriculture" was never working according to the normal plan. Therefore, all the time, there was a campaign and soldiers, pupils, students had to harvest (while the peasants watched the on-going circus). Some other time there was another problem that had to be solved and another campaign was launched.

Some of these campaigns bewitched intellectuals longing for a just, fair society, paying attention to people in need. There was in store a campaign

[6] Vitalii Naishul has claimed that it was *ekonomika soglosovanii* [the economy of getting approvals](Naishul 1993, p.30). He this term as a synonym of *administrative market*. It was, however, a very distorted market. Instead of talking about markets, we would suggest networks of agents as a more appropriate concept. These networks are reshaped by the party and the weights on the connections have lost their monetary character. Thus, our judgment is that the use of the term "market" is an exaggeration. The merit of Naishul is that he challenges the conventional notion of a command economy. Indeed, it *had* to be something different.

[7] See 13.1 on page 206 the reference to Chirot.

for teaching reading and writing skills to humble people. Some other time there was a massive promotion of women in leading positions. Another time, it was the turn of the youth to be promoted or there was some campaign for the spreading of the high culture among the masses.

There is a double effect of these piecemeal plans. On one hand, they systematically ruin independent plans.[8] On the other hand, they generate an irresistible incentive to turn your eyes toward the source of these plans. Individuals try to anticipate the next move of the center. And they spend a lot of resources chasing the favors of the planners.[9]

[8]The story of the city of Bucharest is a powerful example. When Ceauşescu started his campaign of "systematization" of villages and towns, parts of the city were razed in order to make room for the new buildings. Just imagine that a decade or two decades ago (during communism, not before!) you built your own house in some quite neighborhood. Now they teared down your house.

Most of those who protested against the destruction of the town did this on the ground that architectural landmarks were destroyed. Nobody seems to realize that this argument is as good as Ceauşescu's argument. From the choice perspective on value, it was their tastes against Ceauşescu's tastes. In the absence of a market, such disputes are decided on the basis of the balance of power. The "landmark argument" can easily be turned against a free market. The sound argument is to invoke property rights. Without property rights, who happens to have more power, in a dictatorship or a democracy, comes and dictates that this building should remain in place or should be razed down.

[9]When Anne Krueger began her investigations that led to notion of rent-seeking she started from the observation that exchange control systems have a cost (see her paper "Some Economic Costs of Exchange Control: the Turkish Case", *The Journal of Political Economy* 74, no.5 [October 1966]). She concluded that "twice as much output, in value terms, could be obtained from new resources with a liberalized trade regime and an equilibrium exchange rate"(*ibidem*, p.480). She then continued and noted that "in many market-oriented economies restrictions upon economic activity are pervasive facts of life" (Krueger 1974, 291). These restrictions generate rents. Sometimes, rent-seeking is perfectly legal. Sometimes, "rent-seeking takes other forms, such as bribery, corruption, smuggling, and black markets"(*ibidem*). In the final part of her paper, she describes a continuum between a system with no restrictions and a system with perfect restrictions. "With perfect restrictions, regulations would be so all-pervasive that rent-seeking would be the only route to gain" (Krueger 1974, p.302).

Generalizing a bit the idea of competition for rents, we may observe that in a communist system is crucial to draw the attention of the top planners and make them include in the plans actions you are interested in. As anecdotal evidence, I can tell a story. Twenty years ago I was very impressed by the capacity of an economics professor to quote very accurately from a discourse of the general-secretary of the party. When he left the room I expressed my amazement. I thought that he had no better thing to do than study the tedious prose of the general-secretary. A colleague of mine, a lady with a great life-experience, laughed and told me that the professor did not study that part of the discourse – he *wrote* it.

13.2.2 Popper's Philosophy and Transition

Before drawing a final picture of the network of agents model and its possible uses, we have to look again to Karl Popper's philosophy. The question is: if piecemeal planning was the real planning going on under communism, then why it led to those well-known results.

Popper insists that it was *Utopian planning*. That was, in different terms, the illusion that education and propaganda tried to instill to those who lived under that system. But the utopia is logically impossible. We reached the conclusion that, in reality, individuals tried to anticipate the next move of the higher layers of the hierarchy and get some privilege, if possible.

On the other hand, Popper's own terminology suggests that the scale of the intervention makes the difference. We also have shown that the distinction is difficult to draw and makes little sense if we think about such actions as a war on poverty or a plan to get cheap drugs for everyone.[10]

What is left is the essential question: why the method was not rational. The planners identified problems. They formulated solutions. The solutions were tested and then corrected. And the result was chaotic planning. Popper argued that planning without limits also leads to a paradox.[11]

But when it comes to the solution of the paradox, Popper is clearly in favor of deliberative democracy. The rule of expert-planners is replaced by democratic debate. For Popper Athenian *democracy* is the model.[12]

During the transition in Eastern Europe deliberative democracy was obviously not enough. In his late work Popper added an accent on the role of the legal system.[13] Popper did live long enough to be able to watch the transition in Eastern Europe and change the accent in some of his views on society. The most important change seems to be this accent on the role of the legal system.[14] We read this as a sign of a tension between a surface

[10] See also 2.3.1 and 5.1.1 here.

[11] "We thus see that there is not only a paradox of freedom but also a paradox of state planning. If we plan too much, if we give too much power to the state, then freedom will be lost, and that will be the end of planning." (Popper 1945, vol.2, p.130).

[12] He insists on the significance of the chronology of the Athenian democracy. He emphasizes the influence of the book market on democratic development (in *The Lesson of this Century* [London: Routledge, 1997], pp.66-67).

[13] "If a legal system is not first in place, you cannot have a free market. There must be a difference between buying-and-selling and robbing." (Popper, *Op.cit.*, p.33). The market needs rules. "In every walk of life there would be chaos if we did not introduce rules" (*ibidem*, p.60).

[14] See his "Letter to my Russian readers (1992)" in the Russian translation of the *Open Society* (Moscow: Soros Foundation, 1992), pp.7–15. He stresses there the idea the free

conception and the deep structures of his broader philosophical approach. This tension is at work again in the view on the period of transition.

13.3 Communism after Communism

The fall of communism in Eastern Europe in 1989 had its most obvious expression in the collapse of communist power. The communist party as an organization lost its monopoly on power.

From a formal point of view, the historical details are not that important. We do not discuss the content of those historical processes. Social scientists and historians have investigated and will further investigate the transformation of the communist parties. We are interested in a theoretical approach.

In this perspective, the main question is how important was the communist party for the working of the system before 1989? Is it possible for the old structures to function without the umbrella of the communist party?

This question was the subject of bitter political debate and seems improper for an academic discussion. There is however something interesting in it from a theoretical point of view. Does it make any sense to modify the planning model with one central unit and replace it with a planning model with many centers of decision? We will call it the polycentric planning model.

Superficially, the polycentric planning model and the network model seem to coincide or at least to converge to the same model. The first similarity is at the level of decision centers. In both models there are multiple decision centers. And it seems that these centers are bound to establish connections between them.

We will show that the nature of the connections makes the two systems different. Let us take an example. We have talked about national communist systems. Suppose that each has its own planning system. Prices in a planned system are arbitrary.[15] Therefore prices will be very different from

market needs rules. The primitive market may not need any rules, but a complex one does need rules. Therefore the legal system, which regulates contractual relationships, has a key role in the market process (see p.9). In the final part of the letter, Popper develops the idea that the capitalism of Marx was only a mental construct; it never really existed. The leaders of the Soviet Union fought against an illusion. The real Western society is an open society, which is able to reform itself (see p.14). Popper is not very specific on this capacity to reform itself. He just says that "there is *hope*".

[15] All that piecemeal planning that underlies the deceptive facade of the unitary plan is bound to disarticulate the price system, despite the effort to take prices from the outside capitalist markets. Think only at all the "social measures" that involve distortions of the

one system to another. It will be very difficult for the planning centers to coordinate their systems. They are caught into a dilemma. If they change the internal prices, then they lose the autonomy. If they work with two systems of prices, the whole polycentric system is bound to be incoherent.

The network model stresses the capacity of the network to function as a coherent calculation device. If we look at the free market, then the contrast with the polycentric model is obvious. The prices are market prices.

If we look at the case of the postcommunist societies there is no need to strengthen further the argument. We have to note however that any possible generalization is bound to underline the important difference in the rules used in the two models. Whatever tentative we might make, the planning systems are not compatible with the rules of private property.

One may formulate another type of objection. If we push decentralization far enough, then the decision units will coincide with the individuals. What would be the difference between the two models then? First, the important hierarchical structures would disappear and this move would rather look like a collapse than a convergence. Second, it does not make sense to suppose that individuals plan as central planners do. Third, we do not suppose that individuals have the intricate conceptions and develop complex systems of calculations as planners should do in principle.

Pragmatic politicians have sought a solution to these problems. The solution does not pay much attention to theory. It simply tries to combine different social arrangements. Capitalist loopholes are implanted in a planned system and keep it afloat.[16]

13.4 A Review of the Network of Agents Model

It is important to dissipate the possible impression that the network of agents model is only a tool for the analysis of markets or, worse, some kind of ideal social arrangement. No, it is an analytical tool. It emphasizes qualitative elements, structures and processes versus quantitative aspects, but it can be developed beyond the discussion in plain English. It is now the time to summarize it and emphasize the possible reconstructions of useful concepts from economics.

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prices. They are nothing but measures in favor of one corporation or another, but they do distort prices.

[16] See the references here to NEP (12.7).

13.4.1 Individuals as Planners

Using an indirect approach, we reached the conclusion that individuals are making plans. The indirect approach is significant because it shows that only these individual plans have to be treated as basic. It is useless to look for their meaning as parts of some broad, all-encompassing plan.

Individuals develop connections among them. This is a natural consequence of the fact that they act. These connections are very weak if I am on a remote island, but are much stronger if individuals exchange goods or develop common plans for complex actions. On each connection there are weights that help individuals to compare alternative connections.

The connections are not activated all the time. Most of them are made up of potential actions that are never transformed into actual actions.

13.4.2 Networks and Choice-Points

Further, we may generalize the previous idea of individuals and connections and introduce the networks of agents. The network has *states*: it has a topology (configuration of agents and connections among them) and activations of some connections.

The states of the networks are used as logicians use their possible worlds. Each state of a network is a choice-point.

We enrich the structure of the choice-point by adding to it reflections of other choice-points.

The enriched choice-points structures are extremely useful, because individual agents generate for each choice-point a stack of values. It would also be impossible to conceive the plans without such a rich structure of the choice-points.

From this perspective, values are *values at a given point for a given individual agent.*

13.5 Agents, Networks, and Calculations

We worked with a bare, abstract concept of plan. The idea behind a plan is an algorithm. This was both necessary and sufficient for our criticism of universal comprehensive planning.

As one can easily see, the model might be extended if we relax the conditions for the idea behind plans. This does not lead however to a vindication of universal planning. On the contrary, it would further undermine this idea.

In the restricted version of the model, agents are able to compute functions. They are able to integrate the data from value stacks, weights on the connections and their own budgets and decide if they activate or not a connection. However, these computational capacities, even in a complex network, do not need to be exceptional.

The secret of very complex networks of agents is money. The budgets of the agents are quantities of money. The agents transfer money in exchange for actions of another agent (a transfer of a good or a service). The weights on the connections are monetary prices.

All the individuals can see are prices as transfers of money from one agent to the other, but there is more than this: there are a lot of potential connections. The monetary weights on connections play an essential role. For the agents they are the terms on which alternative connections are possible. One agent or a group of agents cannot change the weights. They change as a result of the functioning of the network like in a neural network. The network is itself a calculation device.

13.5.1 Reconstruction of Transition Costs

For Ronald Coase there are "costs of carrying out market transactions"[17]. The objection is, however, that such costs would be like all other costs. Why would they embody something distinctive in them?

Reconstructed into the language of the network model, these costs are the costs that agents have to bear when they make a plan. They have to give up alternative plans of action. As one can easily see this is not the usual type of cost. If I sit in front of the laptop and write this book I have to give up the action of watching a documentary movie on Atlantis and many other actions. But there are many possible plans for writing *this* book. I might have written it together with one of my colleagues. Or I might have organized a team on the Internet and put all the pieces together.

Coase started with the problem of the firm and this is not an accident. Think that you want to make cars. You might make a lot of plans for buying parts and assembling them. But you might make another plan and set up a firm. You end up with the same result, but the costs of the planning of the actions are different.

In the absence of transaction costs, individuals would make only their own plans and they would use exchanges in order to obtain what is necessary for the performance of their plans.

[17] (Coase 1991, p.255)

Transaction costs do exist because plans have different degrees of complexity. It does make no sense to choose a combination of plans that is very complex. It will stifle the actions of the agent. She would have to activate far too many connections and the network would react anyway. Long term contracts with such an agent would involve connections with very disappointing weights on them.

13.5.2 Rules and Interventions

Rules are constraints on the connections. In the absence of the costs of the plans, there might be no need for rules. Somebody might like to sit near his car and watch it all day. Unless he makes money as a taxi driver, this would also have disastrous consequences in the network.

One of the interesting aspects of rules is that, despite the intimidating term 'constraints', they facilitate a rich topology of the network. Without rules, the costs of plans go up and the network is very poor in connections.

Let us think about the following thought experiment: there is a group of producers and a group of thieves. The thieves take all the "surplus" of the producers. First, the producers try to defend themselves, but they are powerless. Then they discover that, from their point of view, it is much more efficient to produce just as much as they can it. They gather fruits and hunt animals and sleep in caves. The thieves are amazed. There is nothing left for them and the first drought kills most of the producers.[18]

Rules are useful for avoiding interferences of plan. I plan to use watch during the evening a movie. The thieve plans to take the TV set. He is quicker than me and my plan fails.

As we have argued, private property has a logical reason. It avoids interferences of planning through rules that permit to decide who can plan what: these are individuals who can design their unique plans of action. More complex plans are the result of agreements.

The fact that the model can capture the rule of private property does not mean that it cannot offer a reconstruction of interventionist activities. We just discussed them on separate models in order to identify the particularities of these activities.

The active intervention on a network can affect both the topology and the weights on the connections.

[18]The story is inspired by the actions of Lenin and his party during 1917-1921.The party had a policy of surplus food appropriation that led to a catastrophic famine. See on this topic Heller and Nekrich (1986, especially p.114).

Communist intervention redesigned the connections and shaped vertical corporations.The communist party redesigned networks in such a way the horizontal connections were cut or strictly under party control.

The second type of intervention concerns money transfers. If money transfers are centrally managed, then monetary weights on the connections vanished. At some lower levels it is possible to reinvent money,[19] but this does not work for big firms.

For big firms, under such a system, the weights on the connections are represented by personal acquaintance. The limits of such connections are quite obvious, but they persisted during the transition.

13.5.3 Reconstruction of Rent-Seeking

If we set aside ideal models in which the rules of private property are respected without any enforcement, then interventions are always a part of the model. They are, of course, of different types. For the thief, the enforcement of the rules of private property is an intervention in the network that he likes most. Connections are cut, the costs associated with certain actions soar up.

On the other hand, export licenses are also interventions. If you want to connect yourself with an external market you have to get such a license.

The interventions of the communist party in the working of the network were a matter of daily routine.

Individuals have to anticipate the interventions, as they try to escape their worst consequences or to speculate them for their own profit. In this sense, there is always rent-seeking in a generalized sense.[20] This means that a lot of individual activity is directed toward the interventions.

Starting from this observation it is possible to formulate an important distinction between the activity of intervention-watch (rent-seeking) and the actions that are guided by the observation and anticipations of monetary prices.

13.5.4 The Market Process

Networks change their states quickly. It is only for theoretical purposes that we might “freeze” a network and take a picture of it. We want to study

[19] During the 1980s, in communist Romania, Kent cigarettes were the real money. You paid the doctor with Kents. You used them to bribe people or simply to buy something. Read the complete story in (Dolan and Lindsey 1988, pp.287–288).

[20] See the reference to Krueger in 13.2.1.

the topology and the activations of the connections for that possible world.

We have used the logician's possible worlds in order to have a conceptual framework that is richer than the usual reference to moments of time. Time can be reconstructed in the language of possible worlds. However, if we use possible worlds, the process of change of a network unfolds in a complex universe of possibilities.

Let us say that two entrepreneurs in a capitalist system anticipate different, branching paths of the evolution of the network in the universe of possibilities. Until the branching point they do not make any revealing moves. A third entrepreneur anticipates that they are anticipating different evolutions of the network and speculates this situation. Who gains? It depends. It depends on the process that, in this case, we may call the market process. It is a market process because it involves a network with monetary prices.

There are no entrepreneurs in a communist system. Their counterpart is the bureaucratic fixer. The fixers does not use monetary prices. He has to anticipate the evolution of the network on the basis of what he knows about the personal relations between powerful persons. Unlike the capitalist entrepreneur the bureaucratic fixer does not have to pay much attention to the desires of simple people. The fixer watches the layers of bureaucrats above him.

Complexity, not wickedness, prevents the fixers from watching the layers below him. Without market prices it is impossible to observe what happens in the deep layers of the hierarchies imposed by communist rulers.

13.5.5 Perverse Incentives

The planning systems are incomplete as systems of orders for the individuals. Thus individuals have a space for their own decisions. Short-term plans can be fulfilled rather easily. Long-term plans are more problematic. They are affected by the omnipresent piecemeal-planning.

The fixer also looks for opportunities of action. Fixers look for a higher position in the system. This is absolutely normal from the point of view of human action.

The different positions are bound to be valued differently. In this way they constitute incentives for actions. The individuals anticipate that they can gain this or that. They try to find speculatively the best way to live within the limits of the planned system.

The system is nevertheless perverse in two ways. The weights on the connections are distorted. They can tell the individuals what the bosses

like, but not what the wider community likes.

On the other hand, the prestigious positions in a planned system are at the key points of the hierarchy. They are connected with tyrannical interventions. The fixer is stimulated by the incentives in the systems to act as a tyrant.[21]

The systems of polycentric interventions and the mixed systems develop the same kind of incentive structures. The most famous is the tendency of various bureaucratic organization to perpetuate themselves. This is the most telling example of perverse incentives, because the ties with the rest of the community are meaningless. All that counts is the organization itself.

13.6 The Incentives in the Network

If we look at the incentive structures in the network model we find a vivid contrast with the perverse incentives. The weights on the connections are the key of the incentive structure.[22]

Weights on the connections of a network change in order to make possible the functioning of the whole network as a calculation device. Each weight is not a self-contained story. But the internal adaptations that take place in the network lead to weights that are part of a great story.

The knowledge is distributed across the network, but each piece of knowledge tells something important. The weights also stimulate the actions of the individuals.

Many authors have objected to the incentives that tend to develop in the network with monetary prices. For example, some writers criticize the role of advertisement. They claim that publicity creates artificial, useless desires. The answer is that it is very important to look at the problem from the point of view of the network model. Individuals are connected directly with a limited sector of the network. How could they know what other connections are possible? What would be the alternative? Some bureaucrat that collects data? This is the solution of the central planners, not of the market.

[21] The best argument on this topic is formulated by Hayek (1986, chapter 10).

[22] Kirzner makes a distinction between two levels of incentives. On the first level there are opportunities for entrepreneurs and incentives are needed in order to act. The second level of incentives is needed in order to maintain *alertness* to the possibility of unperceived opportunities (see Kirzner 1973, pp.228–229).

13.6.1 Transition to Liberty, Rent-Seeking and Incentive Structures

The analysis of the transition in Eastern Europe is not possible without such concepts as transaction costs, rent-seeking and incentive structures.[23]

Authors use to say when they face social phenomena that they are "too complex" to be analyzed in a few words. The problem might be reversed. Maybe the explanation lies in the impact of complexity upon agents. How are individuals coping with complexity?

Reversing the question in the case of Eastern Europe is absolutely illuminating. We will again ignore the details and use the abstract model. The link with reality should however be obvious.

Let us use one of those philosophical experiments and imagine that you lived under the communist system and you wake a little late one morning and discover that it had collapsed.[24] The big corporation on the top, the communist party has disappeared.[25] The secret police is out of sight.

It does not matter if the events make you glad or sad. How can one act rationally in the new environment? Journals are given away for free.[26] Books are published at subsidized prices, but there is complete freedom of speech now. The big corporation has disappeared, but at lower levels meetings are held along the same type of corporate structures. There are no alternative structures!

After a few months markets based on monetary prices have appeared. But nothing works. Where is the problem?

Let us think about the best possible conditions. Even in real situations it is not that difficult to understand how to use monetary prices. Thus nobody has problems with computations because of these prices. Despite the lack

[23] See (Colombatto 2002).

[24] This happened literally in Romania during 22 December 1989. During the evening of 21 December the system was in place, killing people in University Square. If one had waked up the next morning around eleven or twelve o'clock, he would have discovered that all the communist party has completely collapsed.

[25] This is in the *imaginary* experiment. Vladimir Tismăneanu describes the real facts in the following way:"In Romania, for instance, the communist party,... seemed to vanish without trace following the spontaneous anticommunist uprising in December 1989. But was that disappearance an accurate perception? Can one seriously believe that a political movement that numbered almost 4 million members before the December 1989 revolution had simply left the historical scene without leaving any legacy? For many, the National Salvation Front, the formation that rose to prominence during the vacuum of power that followed Ceauşescu's flight from Bucharest, was simply a reincarnation of the old communist party"(Tismneanu 1991, p.247).

[26] This is also inspired from a historical fact. It happened in Bucharest after December 22, 1989.

of very well-structured institutions, nobody has problems with the rules of private property and freedom of contract.

They do have however a problem that cannot be solved quickly. Networks are very poor in connections with monetary weights on them. Especially the potential connections are very limited.

In these conditions the government becomes more and more active. It has discovered a new reason for intervention: transition itself.

It soon becomes apparent that the new interventionism offers incentives for a new type of rent-seeking. Perverse incentives[27] are again omnipresent. Basically they turn the eyes of anyone who wants to make a profit in the direction of the government. Anyway, at least half the time, the eyes are turned to the government; the rest of the time they watch prices.

The transition is pointing in the direction of a mixed system.

There is however a factor that has not been examined: the minds of the individuals. They might make the difference.

[27] 'Perverse' has here a technical sense. It means that individuals look for opportunities offered by the governmental budget. They are recycling tax money. The window of opportunity in itself is very small here compared with the opportunities that could arise in connection with the desires of millions of consumers.

Chapter 14

Minds and Markets during the Transition Process

The historical turn of 1989 offered materials for a unique test. Individuals had two opportunities that were denied to them before: to trade and to voice their opinions. The history of their choices is not the object of this book.[1] But there is also a theoretical interest in this interplay of trade and voice. How well they coexist? What happens when they are in conflict? How are conflicts of opinions adjudicated? We analyzed before the processes through which voices make liberty unstable.[2] Now we want to examine the reverse of this problem. How far can get the transition to liberty when individuals also want their voices to count in the life of their communities?[3]

The world of democratic, deliberative democracy is colorful and mysterious for those who study democracy from an economic point of view. What is the profit for an individual voter at the polls? Her chance to influence elections is very tiny. Why would an individual bother to study seriously the effects of political programs? Again, the cost is far greater than the benefits.[4]

We attempt to show here that the ebullience of democracy during the transition from despotic planning to liberty has a possible eco-

[1] See, for example, (Tismneanu 1991).

[2] See 10.7.

[3] See Dicey about public opinion's acceptance of individualism in 10.7.

[4] The interest of the voter for mere gossip and sensational stories about politicians is called by the economist *rational ignorance*. The market for legislation is aptly described in David Friedman (1990, pp.546–547). The reader can find there an example of rational ignorance in the context of a broader introduction to the analysis of democracy from an economic point of view.

nomic explanation. The enthusiasm for democracy is, at the same time, perfectly (one might say dangerously) compatible with rational ignorance.

14.1 Conflicts and Justice

Let us start with a network of agents model without any conflicts. There is no dispute on the nature of the rules that constrain the connections among agents. There is no dispute on the application of any rule. It is quite obvious that the model is not realistic. But, starting from it, as in the case of universal planning, we may study the abstract logic of the extension of such a model. We might just assume the existence of conflicts among agents, but this would not let us have a closer look at possible grounds for conflict.

The choice points are very helpful in this moment. Choices of different individuals can easily conflict. Choices are neither determined by needs nor follow a pattern. This shows that there is a source of potential clashes between agents.

When the object of the choice is an out-of-the-way opportunity that was not tried before, existing rules can be applied differently. There might be problems in extending the rules to the new case or in applying the rule in this case. The rule systems are not complete and they offer, at least in principle, a space for differences of judgment.

Thus conditions for conflict exist even if we do not assume that individuals use force or deception. Of course, they do use force and deception in a real world. But conflict can arise without them. It is a conflict that is generated by the nature of the rules themselves. Two agents may think for a while that they apply the same rule, because they encountered only cases that are treated similarly under two different rules. When they reach a branching point they discover that they apply different rules. They are in conflict.

Let us now suppose that the two sides in conflict go to a third party and seek justice. Again, this is the minimal supposition that we might make. Violent resolution of the conflict is too much for what we want to show next. We want to show how voices are taken into account.

If we try to extend our model, then we have to add a set of judges. There is no reason to infer that only one judge will emerge after conflicts. Why would go everybody to the same judge? We have to assume that there is a set of judges. The really important question concerns the relations

among these judges.

We could try to apply the network model to the relations among the judges. However we have to remember that the network model is a model of interactions. What are the interactions among judges? If one decides a case in certain way, then all the others must accept the decision? What if the two sides in conflict do not accept the decision and go to another judge and so on? What is the relationship among these decisions?

There is a dilemma involved in the multiplicity of decisions. On one hand, if the decisions have equal validity, then the network is splited along the lines that divide the two decisions.[5] On the other hand, if one decision cancels the other, then the two judges are on layers that are at different hierarchical levels. At the top there must be an instance of last resort and, under it, layers with judges that can revert decisions from inferior layers.

We have to go along the second horn of the dilemma, since we want to see what happens in the case of people who want to remain in the same network, with a set of common binding rules. This is obviously the case during transition if the former communist-designed corporations manage somehow to stay together.

Somebody might object and say that the judges may work in a pure flat network. The network itself is going to output the final decision. This would be a good explanation for the way in which people discover rules, but there is a computational problem when two sides are in conflict.

Let us say that somebody dies, leaves no will and has a daughter and a son. The daughter and the son are in conflict. One judge says that only males may inherit. The other rules that the inheritance should be divided equally. The daughter appeals against the first decision. The son appeals against the second decision. The network of judges may function for a while and we can speculate that it comes with a stable result. The problem is that the final result is a rule, not a decision in the case that opposes the son and the daughter.[6]

There is one important observation here. This is not a discussion about private versus state justice. There is no problem to assume that the whole

[5]This is not a problem for the libertarian, who can come up with the idea of a framework under which utterly different networks of agents coexist. The standard argument in favor of this solution is the third part in Nozick (1974). For a recent discussion of this approach and libertarianism as a way of life see the very interesting discussion in Engelhardt (2000, pp.134–138).

[6]There are many much more dramatic and interesting examples of rules in Engelhardt (2000). Abortion, euthanasia, cloning and many other issues offer a material for a much more intense debate, but we have here the interest to keep a low profile. All that we need is to prove the *existence* of conflict, not its deep significance.

system of justice is private.[7] At the same layer, there is also competition among judges. At a given level, one has the option to choose a judge. If she wants to appeal against the decision, then the rule is that she has to go to a higher level in the hierarchy. The problem is similar to the market versus hierarchies question. It is like the explanation of the nature of the firm.[8] Firms may also develop standards, as judges reach a consensus on a rule. The analogy is imperfect, but it suggests the process.[9]

Judges have problems similar to those of the central planners only if they try to develop universal systems of rules. Rules are imperfect and cannot cover everything.

14.2 Making Your Voice Heard

Until this point we have shown that grounds for conflict do exist and no system of rules can solve them on spot. It is now natural to assume that individuals have different opinions about the rules that should be applied in case of conflict. They also have a variety of opinions on the interactions between them. But why would they like so much to have a voice in all these matters?[10]

[7] For a system of private justice see David Friedman, "Toward a Private Legal System", *Nomos*, nos.38–39, pp.9–13. David Friedman questions the distinction between criminal law and civil law. He suggests that it is easier to convert civil law into a complete private system. Therefore an intermediary step toward a private legal system is a pure civil law system. The topic is further analyzed by Friedman (1989, pp.114–120, 201–208). David Friedman also investigates law enforcement in Iceland(930-1263), the only known historical example of a private legal system (Friedman 1989, pp.201–208). "The court system had several levels, starting at the thing court and going up through the quarter courts to the fifth court"(Friedman 1989, pp.202–203).

[8] For Coase's theory on the nature of the firm see Williamson and Winter (1991). The book includes Ronald Coase's 1937 paper. Coase did consider also the government from the perspective of the firm: "The government is, in a sense a super-firm (but of a very special kind) since it is able to influence the use of factors of production by administrative decision." (Coase 1991, p.256).

[9] For example, there are different TV standards, but the same movie can be recorded in all the different standards. There are also different standards for computer files, even if they are simple text files. But we can convert from one system to the other and read the same text. Conversion does not work for legal cases. In the case of an inheritance problem, different standards lead to different decisions. The super-firm of the judges has to develop a uniform standard.

[10] Gossip plays a much more important role in everyday life than we suspect. See Robin Dunbar, *Grooming, Gossip, and the Evolution of Language* (Harvard University Press, 1996). Dunbar suggests that language evolved in connection to conversations in which people keep up to date with family and friends.

Most of these questions require an analysis of the meanings of the opinions and their relations to human minds from an empirical point of view. Thus they are out of the reach in a formal approach to human action. But the formal approach may still go on, bracketing the content of the opinions, and analyze the intensity of the debate. From the formal point of view, it does not matter if the debate is about abortion or privatization. It does not matter also if the opinions are for or against either abortion or privatization.

As in many other moments of our argument, we will go back to the examination of the logic of central planning. Let us suppose that an interesting twist takes place in the central planner's approach. The planner asks the individuals to voice their opinions. It is as if the planner would say that from now on the decisions are taking into account the opinions of the individuals.

There are now at least two sources of flows of opinions: opinions on the rules as applied by judges; opinions on various instances of piecemeal planning. Judges do have reasons to listen to opinions; at least they might think they need them for deciding difficult cases. There was also a twist in central planning. These are the minimal suppositions that we have to make in order to capture a transition process.

The result is somewhat surprising. Beyond a market for ideas, there is always a tendency to express opinions along a hierarchical structure.[11] The hierarchical structure is minimal at the beginning, but has an in-built tendency to expand.

14.3 A Neighborhood Effect

If someone wants to tell something to her neighbor in the classroom, she whispers. But somebody nearby wants to tell something to his neighbor. He whispers, but a bit louder. Others start to talk and every individual is talking a bit louder to her neighbor. This is the explanation of the noise in the classroom from an economic point of view.

We will try to explain democratic noise with the help of the same type of argument. The basic idea is that individuals try to make their voice heard a bit beyond the borderline of their immediate connections.

Individuals have a limited number of friends.They also have a limited number of connections with unknown persons. The number of direct trad-

[11]For an illuminating discussion of the market for goods and the market for ideas see(Coase 1974). Coase stresses the fact that regulations treat differently the two markets. Intellectuals have supported free markets for ideas, but were opposed to free market for goods(Coase 1974, p.385).

ing partners cannot be very large compared to the whole population. We will call this area, in the terminology of the network model, the neighborhood of an individual. In a network, every individual has a neighborhood.

Discontent within the limits of a neighborhood is perfectly normal. Sometimes the solution is found within the limits of the neighborhood or with the help of judges. In other situations the individual does not find a convenient solution within the limits of the neighborhood.

If we think about the other source of debate, the piecemeal plans, the argument is similar. Discontent is perfectly normal. There is also a feeling that the neighborhood is not able to solve certain problems. Minds cannot be prevented from thinking that somewhere, beyond their neighborhood, a solution can be found.

Because she feels that the solution is beyond the neighborhood, the agent will try to make her voice heard at least a bit beyond the immediate neighborhood. If many individuals send a signal beyond the same neighborhood or adjacent neighborhoods, it is difficult to get the attention of the section of the network where all these voices are crowded. Then one goes farther toward the larger community. The combined result, from many directions, is a discordant chorus of voices.

We might explain in the same way why the bourgeois mentality is adequate for a free market. The bourgeois cultivates her own garden and pays attention only to the neighborhood. Every problem is solved through the market.

The critics of the bourgeois mentality reject what they interpret to be its narrowness.[12] They claim that one should be interested in a broad range of problems and should carry her message as far as possible.

14.4 Democracy versus Liberty

It is now possible to sketch briefly the contrast between trade and voice. Trade is associated with the following approach: if you cannot solve your problem in your present neighborhood, then look beyond it; search for new connections and look for profit elsewhere. Incentives for entrepreneurship are very important in this approach. Trade is closely associated with a pure system of liberty and leads to highly complex networks. Its problem, especially during a primary transition phase, is the presence of high transaction

[12] One more note should be added on(Coase 1974). Coase explains the support of intellectuals for the market of ideas as a result of self-interest. Paradoxically, the support for freedom on the market for ideas leads to claims that freedom on other markets should be limited.See(Coase 1974, p.386). This is a source of the anticapitalist mentality.

costs.[13]

Voice is associated with exuberant expression of opinion well beyond the immediate neighborhood. In its primary phase, it is not associated with the establishment of new profitable connections. Think that you try to model the connections established through the expression of one's voice. There are no monetary prices to use as weights on the connections. Ideas, personal acquaintance – these are the elements from which one might extrapolate the weight of the connections. The contrast with the expansion of liberty through trade is vivid.

Does this contrast go beyond vividness? Is it transformed into some structure that has tangible effects? Voice is also a form of action.In the discordant chorus of voices who want to get their message as high as possible new networks emerge. Which ones will function best? Networks with monetary weights on connections offer the only chance to calculate efficiency in a rational way. It is a sad paradox, but such networks are associated with interest-groups. Concentration is not the only advantage of interest-groups. It is rather their ability to calculate rationally that is the main advantage.

Interest groups push toward the adoption of various piecemeal plans that serve their interests. Their potential adversaries are not only dispersed; they would have to promote rules, not plans and to calculate the efficiency of such rules. They lack the network within which to calculate the efficiency of the rules.

A sufficiently rich system of rules sends us back to the problem of the coherence. If each rule reflects the strength of the voice of a different group, then the whole system has almost no chance to be coherent.

Therefore the discordance with liberty is extremely intense. The overall effect is a system that is far less complex than a system of liberty and generates a lot of inefficiency (in palpable, monetary terms). The only way to bypass this effect would be a constitution that separates voice and trade.

This constitution would be however itself a most conspicuous evidence of the intricate tensions of the human condition. Those who promote it often complain against a separation between liberty of expression and liberty of trade. Now they would inscribe it in the constitutional rules. Probably, the separation should run between the action of interest-groups and trade.[14]

We have examined the impact of opinions upon liberty. It remains one

[13]For transaction costs see 13.5.1 on page 214 ff.

[14]James Dorn,"Insulating Economics from Politics: Toward a Constitution of Liberty" (Dorn 1991, pp.277–283) offers a review of the problem of the separation between politics and economics.

chapter to be written: a chapter on the coherence of the ideas about liberty. We started the whole indirect approach to liberty arguing that the direct approach is vulnerable to the objection that it cannot be coherent.[15] We have now to show that the indirect approach has a better chance to stand up against the objection of inconsistence.

[15] See 5.3 here.

Chapter 15

Liberty and Human Action

We focused in the book on a coherence theory of liberty. But are the *ideas* about liberty coherent? We argued that a unique ideology of liberty is theoretically impossible.[1] This result is corroborated by empirical results.[2] Being the object of some common or several concerns is, however, not the only status of liberty. Liberty is also the object of academic study. From this perspective, there should exist a set of shared presuppositions.[3] In this chapter we will examine how would be possible to *homogenize*, not to dehomogenize, the presuppositions of the study of liberty. Between the wise prudence of Milton Friedman, the acid criticism of planning of Ludwig von Mises and Hayek, the mathematical formalisms of Gary Becker and the transparent prose of Ronald Coase, the approach of James Buchanan and the analysis of Robert Nozick in *Anarchy, State, and Utopia* or the brilliant arguments of David Friedman[4] it seems that it is impossible to find a common set of presuppositions.[5] On the other hand, philosophically, they are very close. They seem to share at

[1] See 11.3 here.

[2] See the "Liberty Poll" in *Liberty* (April 1999). See also 11.3 on page 185.

[3] In the case of sentences, a presupposition, if it is true, is solidary both with true and the false sentence. The presupposition is indicating only if the sentence has a meaning or is meaningless. If the presupposition is true, the sentence is meaningful, else it is meaningless. The foundations of this approach to presuppositions have been laid by Peter Strawson (see his famous paper "On Referring", *Mind* 59 [1950],pp.320-344). A simple illustration of this principle would be the following: two linguist may agree that a certain language *x* exists (this is the existential presupposition, but they found different grammatical categories in it.)

[4] For a review of the literature on liberty see Palmer (1997).

[5] The lack of common presuppositions would be a tremenduous problem. It would show that they talk about different things (have different meanings for the same concept).

least a presupposition: liberty is a perfectly legitimate subject for theoretical analysis. From this point of view, liberty is not a political slogan, an ideal, or a feature of the human condition. We can formulate about liberty theories that can be discussed, criticized and developed rationally. Some of the authors may think that these theories are purely *a priori*; others think that they are empirical. They might have difficulties to engage in a common debate on their surface theories, but they share however some deep common presuppositions.

These final comments make no attempt to investigate the moral or the political implications of the ideas on liberty.[6] Moral and the political connotations are only collateral effects of the model. Important moral questions, such as the link between liberty and responsibility, are not on the agenda. We focus on the coherence of the set of presuppositions behind the study of liberty. And if we examine the possibility of using liberty as a standard for rules, we want to see if one *could* use liberty as a standard, not if one *should* use liberty as a standard or criterion.

15.1 The Minimization of Interferences

We have developed a concept of liberty as coherence. Obviously, this is very far from a "anything goes" perspective.[7] Surprisingly, sometimes we seem to face a "nothing goes" type of problem.[8]

[6]The political philosophies based on liberty tend to be especially diverse. One might suspect that there is no common political philosophy of liberty. What would make such different authors as those mentioned above share some homogeneous group of principles? The only speculation might along the lines of a mixed system: free market, democratic gossip and the super-firm of the judges. For the idea of a mixed regime as the best regime see Strauss (1953, pp.142–143). According to Leo Strauss, the classical combination is between kingship, aristocracy and democracy. Free market and rational calculation makes here the difference. The classics (Plato and Aristotle) looked for the rule of the wise. Democracy remains in the same position: it should be checked by wise judges and insulated from economics.

[7]For more arguments on the difference between licence and liberty see Barnett (1998, pp.1–26).

[8]The distinction is inspired by the "nothing works"–"everything works" distinction in David Friedman (1992). The example that follows is also adapted from (Friedman 1992). However, the terminology is that of the anarchist epistemology of Paul Feyerabend, *Against Method* (London: Verso, 1993). Feyerabend emphasizes the idea that "there are no general solutions"(*ibidem*, p.xiii). Starting from this premise, he reaches the

Let us take the famous problem of pollution as an example. We will discuss an imaginary case. In this case, there is a factory *A* and two landowners *B* and *C*. Then the story goes on as follows: in the first part, the factory pollutes the two landowners. The second part has two versions. In the first version, the factory pays for the elimination of pollution. In the second version, *B* pays for the elimination of pollution. Landowner *C* is a patient of the actions in both parts of the story.[9]

The example of the pollution is even more troubling than the stability problem of liberty. In the above case, landowner *C* is absorbed by the network. Her liberty is affected. Somebody might wonder why would *C* formulate any complaint in the second part of the story, when pollution stops. The answer is that, even in the second part of the story, her plans of action might be affected adversely. Perhaps she planted trees, because she thought this is a cheaper way to fight pollution. If there had been no pollution, then she would have cultivated flowers.

Before we go on, we should try to assess interference into the plans of action of other individuals. A certain amount of such interference seems now to be like a background noise. It is inevitable. Should we rewrite the definition of liberty? If we accept it as a background noise,[10] does it mean that we justify it? We may rather compare the acceptance of the background noise with the orthodox attitude toward killing. Killing is a sin in all situations.[11] The background noise is inevitable, but it represents a

conclusion that "there is only one principle that can be defended under *all* circumstances and in all stages of human development. It is the principle: *anything goes*"(*ibidem*, pp.18–19).

[9]Starting from cases of this type, a major point of disagreement arose between different analyses of liberty. Murray Rothbard claims that such cases can be reduced to the "external benefit" argument (Rothbard 1970, p.884). The external benefit argument is precisely of the form: *A*, *B* and *C* do not seem to be able to do certain things without benefits for *D* (Rothbard 1970, p.883). Then Rothbard examines the two possible horns of a dilemma: *A*, *B* and *C* should do more for *B*; *B* should pay (Rothbard 1970, p.886). Rothbard points out that both horns of the dilemma should be rejected. They would both force the individuals to adopt plans of action under the pressure of government intervention. Rothbard's argument had a fateful impact on the Austrian School. It did not contribute to the debates in which such authors as Buchanan and Coase were intensely involved. For this debates see (Cowen 1988). The discussion led to results that were far from being in favor of the governmental intervention. Beside these episodes in the history of ideas, there is something in Rothbard too. He does recognize the fact that the four have their actions inextricably intertwined.

[10]A certain amount of interference between plans is absolutely natural. See 12.3.1 for this problem.

[11]Other versions of Christianity have adopted the argument of the double effect. But, as H. Tristram Engelhardt has shown, "The Church of the first millennium, at least in case of

limitation of liberty.

Let us depart now as far as we can from the moral connotations and try a simple imaginary experiment, an 'what-if experiment'. What if all the agents in the network try to respect the liberty of the other. What would they do? They would not interfere with the plans of the others. But, in order to know what plans the others might have, they have to identify the private property of the others. Thus private property and minimization of the interference[12] in the plans of the others would be the result.

In our previous experiment, landowner *B* would not be able to ask *C* to share the price of elimination of the pollution. For this he would have to invoke something like solidarity or a community of interests, but not liberty.

15.2 Agreements and Efficiency

Those who favor solidarity or the community spirit might however come forward immediately with the objection that respect for private property and the minimization of interference in the plans of others leads nowhere. They come back to the pollution example and argue that, when the factory *A* and the landowner *B* try to disentangle their plans, they interfere with the plan of *C* to plant trees (with not other reason than fighting pollution). The answer is that an interference with the plans of others means only that a step of their plan cannot be performed because of your actions.[13] There is no obligation to create the conditions for the success of the others nor any obligation connected with aims of their actions and their efficiency.

However, the imaginary objector insists and claims that minimization of interference pushes the individuals into isolation and destroys the networks. This objection is met by the observation that the rules of liberty permit agreements. If the networks have monetary weights on their connections, the agents calculate efficiency.

In a network with monetary prices efficiency calculations enable agents to take into account beside their private values the terms on which connec-

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homicide, did not employ the doctrine of double effect that developed in the West, which held that one is not culpable for foreseen but unintended deaths achieved through means not evil in themselves that are fatal to one and beneficial to another person" (Engelhardt 2000, p.277). Orthodoxy kept the traditional vision, according to which any homicide is a sin.

[12] The only possible ideal is *minimization*, not elimination of interference. See subsection 12.3.1 on page 193 ff. on property, compensation and efficiency.

[13] See the argument in 10.5.1.

tions are possible. Agents calculate what they have to transfer, what they receive and how their budget is affected. If they strike a deal, the agents are able to calculate their monetary profit.

The main argument for the removal of tariffs is rather their negative impact on the *possibility* to calculate efficiency. The tariffs distort the terms on which connections are possible. For their removal there is no need to get the agreement of all those involved or of a majority. It is sufficient to take liberty seriously.

15.3 Taking Liberty Seriously

The objectors step now forward with their master argument. They claim that to study liberty means to investigate an illusion. Private property, minimization of interferences, contracts and the calculation of efficiency collapse when they are confronted with fraud.[14] The indirect individualist approach has stripped too many elements of coordination and has left the networks without the possibility to devise rules that would be a protection against fraud. Too much cheating in the network would ruin it very quickly.[15]

In a network, from the perspective of liberty, there are two sensitive elements: the plans of the agents and the connections. We will use these elements as guiding lines for a distinction between two types of fraud. We use again thought experiments for the illumination of the links between fraud and the restrictions to liberty.

In the first thought experiment, we imagine that an individual Z has a pretty large library (five thousand books or maybe more). She consults those books even during the night. They are part of X's plans. Obviously, she cannot consult all the time all the books. An individual X goes stealthily into Z's house, takes a book, reads it, then sneaks back and puts the book in its place in the library. The individual Z did not notice anything.

Did X interfere with Z's plans? Yes. The algorithm of Z's action is not linear. She consults a book, *if* she has to check something or to learn more. But, when X took a book, it was not *possible* to consult that book. We have to look at the realm of possibilities in order to see how X affected Z's plan.

Let us skip now the question of the punishment deserved by X. What is important for us is that he stole in a very deceptive manner. It is possible

[14] See Child's argument, discussed in 5.3.2.

[15] The argument might go on and show that it is possible to find a solution without government intervention. The protestant ethic or something similar could save the situation.

even that he left no clues! We assume that *Z* does not know anything. We go further and examine another case.

This time, the individual *Z* leaves a number of books at *Y*'s house. *Z* likes to stroll in the park near *Y*'s house and, when she has an idea, she goes quickly to *Y*'s house and consults one of the books that she has deposited there. *Z* and *Y* have an agreement according to which the books are deposited in the house of the individual *Y*. She did not lend the books to *Y*. In contrast to the former case, the individual *X* comes to *Y* and borrows one of the books. As in the former case, *Z* did not notice anything. We may even suppose that *X* thinks that the book belongs to *Y*. Did *Y* interfere with *Z*'s plan? Yes. The argument is analogous to the argument in the previous case.

This is the first type of fraud. It has many forms and a lot of implications.[16]

Let us develop the argument. This time, *Y* opens a library. She owns the books in the library. She does not lend books, but – if she pays a sum of money – *Z* may come at any moment and read an available book. *Z* likes this arrangement. She learns Romanian and, from time to time, she steps into *Y*'s library and looks for a word in the Romanian-English dictionary. *Y* knows that the portion with the letter K is missing from the dictionary. The bad guy *X* tore the page. But, actually, there are few words in Romanian beginning with K and *Y* told *Z* that the dictionary is complete.

The case is a link between the former cases and the next case. It would be useless to argue too much about what *Y* did to *Z*'s plan. She did interfere into *Z*'s plan to learn Romanian. But this time *Y* used a misrepresentation.

Let's go further. *Y* has transformed the library into a bookshop. She uses the same misrepresentation. She puts the dictionary into the window and claims that it is a new, complete copy. *Z* buys the defective copy.

The problem is not now the interference with *Z*'s plans concerning the book. As long as the book is *Y*'s property, *Z* may only contemplate *possible* plans that include the use of the dictionary. But none of those plans is

[16] Fractional reserves of the banks are similar to what *Y* did. The difference is that the bank deposit's "book" that are indistinguishable. It may give *Z* her money back at any moment, because nobody bothers to ask for the *same* item that she deposited. The disaster is apparent only if a sufficient number of clients ask for their money at the same time. Thus, despite Child's contention,there is a very strict standard against frauds of this type in a system of liberty. Murray Rothbard has a short and clear explanation why, on libertarian grounds, the fractional reserve system is fraudulent (in his *What Has Government Done to Our Money?* (Auburn: Ludwig von Mises Institute, 1963), pp.47–53). The most detailed analysis of the problem, with historical examples, legal and economic arguments, is in Huerta de Soto (1997).

assigned by the rules of private property to her as a unique plan that may be implemented by her. Thus Y does not interfere with a plan that only Z can make and implement. She is not blocking or making impossible in some way the execution of some step in the plan, because Z can only reflect on that plan.[17]

What's wrong? Let us take a distance to this case and look at the famous beans bought by Jack. The con men from the story own the three "magic" beans. They point to the qualities of their product.[18] Jack gives the cow and takes the beans.[19] Jack's mother then tells us what is the problem: the price is the problem. If we are not captivated by the discrete anti-market charm of the story, our intuition tells us immediately what's wrong: the price.

The next step entails a distinction between the price as the quantity of money that are transfered and, in our terminology, the monetary weight on the respective connection. The offeree, in her calculations, uses the monetary weight.

Let us now go back to Y's book-shop. Y distorts the terms on which the connection can be activated. There might be many other connections available for Z. Even if no other shop sells the dictionary, Z still has the alternative between the activation and the inhibition of the connection. But is the distortion a problem in the perspective of liberty? It is, if we look at the weights on the connections, not at the quantities of money demanded or offered for transfer.

Because of a physicalist tendency in the analysis of plans, we tend to think that an item cannot appear, at the same point, in the plans of two different individuals. Two individuals cannot look in a dictionary, at the same time, words that appear on different pages. Weights on the connections have however a peculiarity: they *must* appear at the same point in the plans of different individuals.[20] In our case, they appear in Y's plans to sell the dictionary. They appear in Z's plans to consider different pos-

[17] Child would say that Z is using her market competence.

[18] In fact, if we are bewitched by the logic of the story, we realize that the qualities *are* real. The con men do not know this. But here, of course, it is not the *magic* of the story itself that is in focus. The transaction is fraudulent because the con men misrepresent their product.

[19] Child (1994, p.733) uses this example inspired from "Jack and the Beanstalk" to support his argument that libertarianism cannot coherently reject this fraudulent transfer.

[20] This is not the case with agents' value-stacks. They are not part of the calculations of others under the rule of liberty. Indeed, an altruist that would include the value-stacks of others in his/her calculations can be dangerous, since he/she has reasons to ask the others to "help" him/her in the good work he/she is doing. Ayn Rand can be vindicated along this line of argument.

sibilities of buying the dictionary. *Y* manipulates skillfully the weights of the connection. In order to obtain the desired effect she performs a specific action. This action affects a monetary price that appears, at the same point, in *Z*'s plans. She lures *Z* and feeds into *Z*'s plan of action false data, thus interfering with *Z*'s plans for action.[21]

This is a second type of fraud.[22] We may now conclude that a system of liberty can include a ban on fraud. The usual observation is that markets automatically punish *Y*'s behavior, if she repeats it systematically. The rumor that she is cheating makes her clients cautious and, finally, she is unable to sell and goes bankrupt.

Our ambition here was not, however, to identify the virtues of the markets. We wanted to prove that a coherent theory about liberty is possible, since the subject itself is not an illusion, as the critics would suggest.

A direct individualist approach could not be unfolded on the same terms. How would we justify the actions-as-connections, a key feature of the approach, as we can see in this final part? We would have to adopt the rather unconvincing contention that this is not a move in the direction of a collectivist methodology. Then it is even more difficult to block the intrusion of some collectivist argument in favor of a common concern or some kind of piecemeal plan or some collectivist rule of justice.

We have adopted the indirect approach. Let us say that the Great Planner of all possible human actions has come with a unique universal plan! In other words, let's grant collectivism the maximum possible result. Then we have shown why such a plan is logically impossible and we have explored the consequences.

Using the 'Big–Bang' metaphor, we may say that individuals are released into the universe of possibilities by the collapse of the enterprise of the Great Planner. Empirically, they may be more or less successful in establishing connections among them. The indirect approach shows us however why it is so important that they develop those connections.

The rest is a what-if exercise. What-if liberty is the main rule of the network? What results from this assumption? The network can function

[21] If one wants to extend this argument adding moral connotations to it, this can be done in the following way: weights on the connections are determined by the working of the network; if one side modifies unilaterally or manipulates the weights on the connections, then this is immoral because it transforms the other side into a thing that can be directed as a puppet. On a lower scale, this is less visible. On a larger scale, however, planning is the attempt to transform individuals into puppets on strings.

[22] In Child's terminology, this is a weak fraud standard. In the case of the weak standard, as one can see from our imaginary cases, there is continuum between stealing, fraud of type I and fraud of type II.

and avoid the traps of fraud using only the rule of liberty. There is no need to prove more in order to show that it is possible to formulate theories about liberty.

This possibility to formulate theories about liberty is what unites the authors that we have mentioned at the beginning of this chapter. Their research methodologies, their stress on one aspect or another may vary considerably. They may extend a procedure well beyond what seems acceptable to the others. However, the geography of the force field of these various researches is clearly structured along the lines of private property, minimization of interference into the plans of the individuals, agreements, money and markets.

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