

University of Heidelberg

Department of Economics



Discussion Paper Series | No. 405

Responsibility and Joint Production

Thomas Petersen
and Malte Faber

April 2004

Responsibility and Joint Production¹

Thomas Petersen* and Malte Faber#

* Philosophisches Seminar, Universität Heidelberg, Schulgasse 6, 69120 Heidelberg, e-mail: thomas.petersen@urz.uni-heidelberg.de

Alfred-Weber-Institut für Wirtschaftswissenschaften, Universität Heidelberg, Grabengasse 14, 69117 Heidelberg, e-mail: faber@uni-hd.de

Abstract:

In this paper, we discuss the relationship between responsibility and joint production. Responsibility mirrors our ability to act freely. We can act freely only if we can assume responsibility for our actions and their consequences; the limits of our responsibility are therefore also the limits of our liberty (part I). Thus, a problem of responsibility arises from our partial ignorance with respect to the consequences which our actions entail. Since this ignorance is at least partly irreducible, we are often not able to control our actions sufficiently. As will become clear, this does not only hold for the social world. Correspondingly, a problem of responsibility emerges in nature and the environment from the phenomenon of joint production (part II). The implications hereof with regard to different forms of responsibility will be discussed in part III of the paper. Part IV draws conclusions and offers a perspective for the future.

Keywords: Responsibility, ethics, environment, joint production, knowledge, ignorance, homo politicus

JEL-Classification: B4, H8, L5, O0, Q0

¹ We are grateful to Dale Adams for the translation of our paper into English and to Stefan Baumgärtner, Maximilian Mihm and Johannes Schiller for constructive comments.

Introduction:

Responsibility and joint production are two important terms which are central to a number of different disciplines: Philosophy (most significantly in the fields of ethics and political philosophy), Law, Economics, Engineering and Physics. They entail particular difficulties within each of these disciplines. In addition, important relationships exist between them. In this paper we wish to relate the terms to one another in consideration of the character of knowledge and draw conclusions for economic and political activities.

Responsibility is an ubiquitous phenomenon. In fact, one hardly needs to point out the ubiquity of responsibility. Someone or other is constantly assuming responsibility, or having the assumption of responsibility demanded of them. A whole ethical doctrine of its own - the ethics of responsibility - has developed around the expression. With regard to the environmental problems of the modern age, the philosopher Hans Jonas has now challenged us to orientate morality and politics on a 'principle of responsibility'.

The second term, joint production, is also an ubiquitous phenomenon. The term is derived from the circumstance that, during the production of a certain substance, other products – the joint products – also emerge. However, whereas “responsibility” is an expression belonging to the world of human thought and morality, “joint production” refers to a reality of the physical world. At first, these two worlds appear to be independent of one another. For the evaluation of a situation in physical terms, it is of no significance whether or not someone is responsible for it. Conversely, our ability to assume responsibility and act in a morally commendable manner appears not to depend on circumstances outside of ourselves. Thus Immanuel Kant can declare that it is one's *good will* alone which makes an action morally 'good', morally responsible. For in the evaluation of an action it matters naught what the action actually brings about. “If (...) this will were to lack entirely the means of accomplishing its intention; if, despite its greatest efforts, it achieved nothing at all, and naught but the good will (...) remained, yet it would shine for itself like a jewel, as something of inherent value.” (Foundations of Metaphysics of Morality, Kant IV, 19. our translation)

However, the impression that physical and moral matters are completely separate from each other requires further consideration. For physical matters can undoubtedly have an effect on the moral quality of our actions. This becomes obvious when one considers the phenomenon of joint production.

The first part of the paper is dedicated to the term 'responsibility' itself and an elucidation of its relationship to the term 'joint production'. Part II deals with the problem of knowledge and

ignorance which arises with regard to responsible behaviour and explicates further, the phenomenon of joint production. Part III begins by discussing different types of responsibility and then enquires into how the relationship between political and economic responsibility presents itself under the conditions of joint production. Part IV ends by drawing conclusions and offering a perspective for the future.

Part I: Responsibility

In the ubiquitous usage of the word, the expression responsibility is often ambiguous. 'Responsibility' is a complex expression and the different connotations, along with the various layers of meaning, are often confused. For this reason, we shall use this part to deal in detail with the term 'responsibility' itself.

Section 1 of this part will analyse the term responsibility as in: we have responsibility for something and bear this responsibility with regard to a certain individual or authority. Section 2 will attempt to demonstrate that responsibility is a crucial aspect of our ability to act freely. We are only free and can change the world in with our actions, in accordance with our intentions, insofar as we are capable of assuming responsibility. This, however, also entails the *problem of responsibility*. This problem arises from the complexity of the *consequences* which our actions entail. The phenomenon of joint production contributes not a little toward this complexity. In section 3 we shall describe in what manner responsibility can be, not only a foundation of ethics, but its own ethical principle, even a virtue. Section 4 goes on to summarise our findings.

1. Concepts of Responsibility

(i) Responsibility, in an elementary sense of the word, bears the implication of original causality – “A short circuit was responsible for the fire.” For a human being, however, responsibility means being the perpetrator of a deed or an action. This implies a close relationship between responsibility and freedom. I am only the perpetrator, the author of an action, if this action can be described as the realisation of my intention. Only free actors can have intentions and realise them. Responsibility, therefore, presupposes freedom.

On the other hand, only he who can realise his intentions through own actions and can assume responsible for his action, is truly free or acts truly freely. For insofar as my actions bring about something I do not intend and am not responsible for, they do so *against my will*,

involuntarily (Aristotle 1925, Book III). In this respect, I am not a free actor. Hence, freedom demands the capability of being responsible.

One bears responsibility for the consequences of one's actions. However, these consequences include not only those which one intended - those for which reason one acted in the first place - they also include all those which one can foresee in any manner at all.

Therefore, responsibility primarily means: one assumes responsibility for the consequences of an action, whereby this action can be described as the realisation of an intention (which can succeed or fail). In this manner the expression 'to assume responsibility' remains somewhat undefined. In a first approximation it means only that one ascribes an action to oneself and allows it to be thus ascribed – in Max Weber's ethics of responsibility (Verantwortungsethik; Weber 1988: 551), one 'declares for it'. So far this does not address what responsibility can entail, such as liability etc. Thus the consequences of responsibility are, as of yet, left out of the picture.

(ii) Alongside this primary meaning of responsibility exists a secondary meaning of the word which can be derived from the first and has special significance for the field of politics and, in particular, environmental politics.

One can bear responsibility, not only for an action and its consequences, but also for an object, a being or a specific field of actions. A minister is responsible for a specific department, an office or an area of affairs such as the finances of the state. This means that the well-being - or even existence - of what is placed in his charge depends, at least in part, on his own actions. Thus Jonas (1979, 1984: 391) defines responsibility as: "*care*, accepted as an obligation, for another being – care which, should the vulnerability of its charge be threatened, can become 'anxiety'" (our translation). This sense of responsibility accentuates the fact that those bearing responsibility must also be endowed with power to do what they wish and intend.

Jonas' concept of the term responsibility was developed in light of the environmental crisis. It lends expression to the fact that our economic activity has a significant influence on our natural environment. The concept directly implies the imperative that our natural environment, and thus the foundation of our existence, be preserved.

(iii) Finally, one bears responsibility toward or with regard to someone. An employee is responsible to his superior, the government is responsible to the parliament, and an appointing committee is responsible to the faculty council, etc.

2. *The Problem of Responsibility and Joint Production*

As has already been mentioned, responsibility is the flip-side to our freedom. I am only the author or master of my actions, insofar as I can assume responsibility for them and their consequences. That for which someone assumes responsibility can be ascribed to him. To this extent he is *compos mentis*. He who cannot assume responsibility for what he does is not *compos mentis*. Thus it follows: only he who can assume responsibility is actually capable of taking concrete action.

This leads to the problem of the extent of our responsibility. An action always has a specific objective. The relationship between objective and realisation is a simple one. In contrast, an action as the origin of effects or consequences is a complex matter. Every action has its own set of consequences which tends to be not entirely discernable. Within this set, we generally make out only one individual consequence as the objective of the action, thus elevating it above the others. Setting an objective is always a reduction of complexity and in this manner, one speaks of the goal justifying the action. This is not a random affair, however, but always depends on a specific point of view – that of the moral community as a whole. The means chosen have to be appropriate to the respective ends. If I cut the main electrical cable leading to a house, I cannot call this ‘switching off the radio’, even if this does lead to the radio being switched off. One can say: as long as it is generally accepted that the means are appropriate to the end, the action makes sense. Conversely, it makes no sense to call cutting the main electrical cable ‘switching off the radio’.

Along with the intended consequences of an action there exist further consequences. These unintended consequences we call side-consequences or *concomitants*. The originator of the action does not intend such concomitants but, insofar as he foresees them, he *accepts* or *condones* them. That which an individual ‘foresees’ in this regard is not entirely up to him. He must assume responsibility, not only for the consequences he actually foresaw, but for all those which he could or should have foreseen. Responsibility refers not only to the action itself, but to the prescience of consequences, at least insofar as such prescience is feasible at all.

These reflections indicate that an individual’s responsibility has limits. For one can generally foresee only a part of the consequences of one’s actions. Among other things, one can, for instance, not foresee the chance consequences of an action. Chance consequences are those consequences which an action itself does not lead to by necessity, but which arise from further circumstances which can be given or not – in other words, contingent consequences. Another area in which prescience is severely limited are the possible reactions of others to

one's own actions. An individual cannot be held liable for unforeseeable consequences. He need not assume responsibility for them. Furthermore, such consequences do not belong to the purpose of the action. In this manner responsibility for the consequences of an action always has limits.

The problem of being responsible arises if and when one can no longer survey the circumstances of an action – that is to say, when one cannot observe their complexity. Owing to such complexity an individual is often unable to foresee certain crucial conditions for the achievement of his goals. This jeopardises the possibility of assuming responsibility and thus, the freedom of the individual and his capacity to assume responsibility in the sense of care. In regard to this we wish to address two separate aspects:

a) In political discourse many people demand that the self-responsibility or autonomy of the individual should be bolstered. 'Self-responsibility' or autonomy means: I can take care of myself or my life and I can support myself, particularly in my old age. Such self-responsibility is becoming increasingly difficult in the modern world. Nowadays hardly anyone can make sufficient provision for their old age without outside expertise.

b) A further problem of complexity is the inherent possibility that one's actions are not dictated by one's own purposes and intentions, but by 'systematic regularities'. These arise from the intricacy of the concomitants of an action. The meaning of the action is thus defined by such regularities, not by the enactor himself. In such cases a concomitant of the action – that is to say, a concomitant from the point of view of the enactor – becomes the defining aspect. This perspective is common to social science. Examples may also be found in economic science: according to Adam Smith selfishness in market economies actually contributes to something which can by no means be called its original intention, namely general wealth and well-being. Political economics provides further examples – we are referring to the bureaucrat who has public good in mind, yet only manages to contribute to the inefficient expansion of his administration (see Downs 1967). In these cases the individual is no longer master of his actions; one could say he is 'not-free'.

Thus we derive that the complexity of the sphere of our actions and their consequences jeopardises our potential to assume responsibility. Such complexity places severe limits on our abilities and capabilities.

This problem has long been recognised in Practical Philosophy (Spaemann 1989: 186-202), but so far has only been conceptualised and discussed in regard to areas of social activity. In regard to the relationship between humankind and nature something quite different appears to

be the norm. In modern times, nature has been viewed as being principally under our stewardship and control: that we would “rule nature in practice” was once the hope of Francis Bacon.² We bend nature to our service by shaping her according to our will, generating something out of her – in what is called production. Now we see, however, that our control of nature is limited. We cannot generate something out of her, in other words *produce* something, without simultaneously producing something else which we often did not originally intend. This phenomenon is addressed by the concept of joint production.³ One can transpose the structure of joint production and the problem of responsibility onto each other. We refer at this point to Baumgärtner/Schiller 2001, section 4.

Joint production means that the production of A inevitably brings forth B in a constant or variable relationship. The relationship is asymmetric: the production of B need not necessarily bring forth A. Whether we have joint production or not is relative (at any given point of time for the duration of its existence) to a spatially closed system or, more precisely, to the *representation* of a system which can have a short time-span and abstract from further components or variables. The hypothesis “all production is joint production” holds, as such, only for the comprehensive representation of the complete system of all nature.⁴

Although categories of intention are disregarded in this sense, one can still relate this model to the problem of responsibility. View A as a product, let B_1, \dots, B_n be respective joint products in the comprehensive representation of the complete system of all nature. Dependent on the respective representation of the system, A has the joint products B_1, \dots, B_m , with $m \leq n$. Accordingly, let the action have an intention Z and the concomitants Y_1, \dots, Y_k , whereby the enactor must assume responsibility for Y_1, \dots, Y_j with $j \leq k$. One can say: he is assigned responsibility on the basis of a certain representation of the system of the circumstances surrounding the action, whereby the choice of the representation is not up to him. Between Z and Y_1, \dots, Y_j we also have an asymmetric relationship. For the intention Z generally has concomitants which arise of necessity, whereas these concomitants, made to the intention of the action, need not in turn have the original intention Z as a concomitant. If I purchase an expensive vehicle it will follow by necessity that my wealth decrease. Should my wealth

² Francis Bacon, “In Praise of Knowledge”, quoted according to Horkheimer, Adorno 1968:14.

³ For a comprehensive survey on joint production see Baumgärtner (2000) and for a short appraisal of joint production see Baumgärtner et al. 2001.

⁴ It was shown by Faber, Proops and Baumgärtner (1998) under application of the fundamental natural scientific basis of production, the laws of thermodynamics (which describe the relationship between energy, matter and entropy) that it is not possible to manufacture only the desired product but that something else is necessarily produced.

decrease, however, this would not necessarily entail me coming into possession of such an expensive vehicle.

The concept of joint production illustrates the fact that the economy in its material “metabolism with nature” (Marx 1970: 828, our translation) displays an equally unfathomable complexity as the sphere of human activity. This holds for all cases in which one takes complex environmental issues into account. Let us consider the aforementioned vehicle. Before this vehicle one day becomes waste it gives rise, at every use, to joint products and environmental effects in the form of replaced parts (more waste) and exhaust emissions which accumulate in the environment and themselves bring forth further joint products and effects.

3. Responsibility as a Principle of Ethics and as a Virtue

The complexity of the consequences of one’s actions, and of joint products which cannot be completely monitored, confronts us with a dilemma: how we are to act in a good and correct manner under such circumstances? In light of such complexity the philosopher Hans Jonas (1979) speaks of a “principle of responsibility” which must form the basis of all ethics. Such a formulation has been rejected by Wieland (1999) who reasons that responsibility is not an autonomous ethical principle and thus cannot be a “definitive norm”. However, Wieland has an “ethics of responsibility” in mind which seeks to justify actions by their consequences. Of course, this is impossible if only for the reason that (as we have demonstrated), the consequences of an action under the conditions of joint production, cannot be entirely monitored. Despite this we wish to demonstrate that responsibility, although it cannot be *the sole* principle, is yet *a* principle of ethics and can even be determined as an independent virtue.

At a first glance, responsibility does not seem to be an ethical expression as such, but rather an indispensable precondition of all ethics in the first place. Only he, who is capable of assuming responsibility for his own actions, is praiseworthy or blameworthy in an ethical or moral sense of the word. He alone can act in a praiseworthy or blameworthy manner. In this context responsibility was already conceptualised by Aristotle, as early his *Nicomachean Ethics*. When Aristotle differentiates between voluntary and involuntary actions and declares that “Praise and blame are bestowed on that which is voluntary, whereas the involuntary requires pardon,” (Book III, Ch. 1)⁵ then he is referring to the following circumstance: We are responsible only for that which we undertake voluntarily.

⁵ All quotes from Aristotle are based on the translation by David Ross, 1925.

Therefore, insofar as responsibility is a precondition of all ethics in the first place, it is simultaneously a pre-ethical or ethically neutral category. Bearing responsibility for one's actions as such is neither good nor bad in an ethical sense, and therefore neither praiseworthy nor blameworthy.

We only arrive at the subject of ethical merit and or its opposite, however, when we speak accordingly of assuming responsibility for someone or something. Such a responsibility is always a task which one may or may not have the measure of. In this sense responsibility is something which demands something of us, burdens us with an obligation.

We are addressing such an obligation when we say that someone is acting "irresponsibly". With this we do not mean that he *has* no responsibility for his actions. We mean rather that he is not assuming responsibility for his actions. Someone is acting irresponsible if he, for example, is in some way endangering himself or someone else in a manner he cannot justify.

Responsibility can therefore burden me with ethical obligations. However, these ethical obligations can come into conflict with other ethical obligations. Situations may arise in which, in order to save the life of another, one must resort to a lie or to breaking the law. The recognition of this contradiction caused Max Weber to contrast "absolute ethics" with "ethics of responsibility". Such ethics of responsibility were not simply to justify lying or breaking the law, but to preserve one from being unqualifiedly damned from the point of view of absolute ethics. Weber's concept of ethics of responsibility remained extremely abstract, however. It implied only that one had to "answer for the (foreseeable) consequences of one's actions" (Weber 1988: 522; our translation) and confess to them. What that meant in concrete terms, however, Weber never specified. He also does not address the questions of how one is to choose in an ethical conflict, which consequences of one's actions one must assume responsibility for, or toward whom or what one bears such responsibility.

So what do Weber's ethics of responsibility stipulate exactly? If I am taking my responsibility seriously, then I will own up to my actions and their consequences, as well as be willing to answer or even be made liable for them. Ethics of responsibility, therefore, lay down a simple dictate: You shall not deny yourself as a free individual. What the fulfilment of this dictate requires is simply good will in the sense of Immanuel Kant (see above: preface) which anyone and everyone can possess at any time. This demand is simple, but by no means trivial. The difficulty of assuming responsibility in this manner is demonstrated by the many in politics and economics, who are not prepared to answer and accept the responsibility for their decisions, but instead shelter behind 'circumstances'. Willingness to answer for one's actions and assume responsibility for them is, particularly in political ethics, an imperative directed at

those involved in politics (see below, part III). Still, it is easy to assume responsibility in the sense of Weber. It requires of one, nothing but the willingness to answer for possible unpleasant consequences of one's actions. A government official, in whose administration a serious error has occurred, resigns. Such consequence is nothing which requires any other specific capabilities than good will. On the other hand, European ethics know another form of imperative which requires special talents which must be acquired and rehearsed. This is called 'virtue' as Aristotle knew it. We will now demonstrate that responsibility under the conditions of joint production is such a virtue.

According to Aristotle, such virtues (e.g. justice, temperance and courage) enable one to act in a good and correct manner in one's day-to-day living, and thus to live the 'good life' (Nicomachean Ethics, Book II, Ch. 1). Virtues require more than simply strength of will, however. Virtues always require practice and habituation (Book II, Ch. 1.), as well as an objective and ethically adequate evaluation of the specific situation and one's own possibilities. The ability to make such judgements must be carefully developed and cultivated. According to Aristotle, the most significant point is that every situation is unique in its particular complexity and that it is therefore impossible to formulate a general rule (Book II, Ch. 2) as how to act or conduct oneself. "Matters concerned with conduct and questions of what is good for us have no fixity" (1104 a 3-6). According to Aristotle, action always occurs under conditions of uncertainty and it is virtue which is to enable people to act correctly under such uncertainty.

Thus we come to the very point at which responsibility under the conditions of joint production requires the capabilities Aristotle calls for. For the phenomenon of joint production confronts us with two separate types of uncertainty. (i) We know that our actions give rise to unintended side-products and consequences, what we do not know is whether we are observing all of these or not. (ii) Something else we do not know is which significance such identified or unidentified side-products and consequences have. Situations in which joint production emerges often exhibit an inscrutable complexity similar to that which Aristotle had in mind.

Responsible behaviour demands the following requirements - that is to say, if I am to be responsible for *someone* or *something*, then I must be able to answer the following questions: 1. Which ethical and normative principles must my actions fulfil? 2. What does the preservation and well-being of that which I am responsible for require? 3. Which risks and dangers do my actions entail? 4. Which risks may I run? And 5. What degree of ignorance can I safely tolerate? There exist no universally valid answers to these questions. In order to

answer them one requires a certain form of experience and ethical wisdom which Aristotle calls *phronesis* (φρόνησις) (Nicomachean Ethics Book VI, Ch. 5, 8 & 9). Phronesis is the facility of judgement which can associate ethical edicts with the concrete necessities of any given situation. Phronesis deals with both normative and factual aspects and must relate each to one another in a meaningful manner. All this requires knowledge, not least of one's own inevitable ignorance.

Phronesis - ethical wisdom – is, for Aristotle, the heart and soul of any virtue. He or she who is not wise in this manner, can, according to Aristotle, not be virtuous (Book VI, Ch. 5, see also: Book II, Ch. 6, 1106b 36ff). As we have demonstrated, one can only assume responsibility for something or for others, insofar as one possesses such wisdom. Thus, it follows that responsibility, in the sense of assuming responsibility for *something* (see above 1.3) can be viewed as a virtue in Aristotle's sense of the word. We shall show in parts III and IV what consequences these considerations have for politics, concerning the phenomenon of joint production.

4. Summary

In this part we began by exposing the expression “responsibility” in order to place this in context with the phenomenon of joint production. The complexity induced by joint production in nature gives rise to similar difficulties as are observed in the complexity of social behavioural contexts. The problem of acting right, given that consequences are too myriad to keep track of, leads to an understanding of responsibility – whether in a specific or abstract sense – as a virtue.

There does appear to be one difference, however, between social behaviour and interventions into nature. Joint products and their effects arise by necessity from the process of production, whereas such strict causality does not exist in the field of social behaviour. That “all such things might actually be otherwise” (ἀλλὰ ἴσως ἄλλως ἔσονται), in other words, that they are contingent, was observed by Aristotle as well. In acting there exists an element of unpredictability, namely novelty. For this reason behaviour or taking action was not an object of science (ἐπιστήμη) for Aristotle, but of wisdom or phronesis, respectively. In regard to joint production as well “things can be thus or otherwise” (Nicomachean Ethics, Book VI, Ch. 5, 1140 a 34 – b3), namely whenever one views joint production, not as a natural, but as an economic phenomenon. This we wish to demonstrate in the following part.

Part II: Joint Production, Responsibility and Knowledge

In the previous part we referred to the close relationship between responsibility and joint production, but did not deal with it with regard to knowledge.

Joint production can be conceived of as unintended or intended concomitants of production processes which the producer must – under certain circumstances - take into account or assume responsibility for. However, responsibility requires the possibility of one being able to foresee the consequences of one's behaviour to a certain extent. Phrased differently, one must *know* what one's actions entail.

Responsibility, therefore, raises a problem of knowledge. This problem was addressed in a very instructive manner by Georg Wilhelm Friedrich Hegel.

1. Hegel on Responsibility and Knowledge

The consequences are that part of one's actions which materialise in outer reality. In contrast, the purpose of those actions - that is to say, the essence of those actions - does not meet the light of day, but remains within. Therefore, the philosopher Hegel calls the consequences of one's actions "the shape which has the purpose of the action at its soul" (Philosophy of Right § 118)⁶. Hegel goes on to differentiate between the necessary and the chance consequences of an action. Necessary consequences are those which an action always, or at least generally, entails. Chance consequences, on the other hand, depend on further circumstances, separate from the action itself, which can be given or not (§ 188). One can expect a rational human being to have an awareness of the consequences of his actions. Hegel calls this awareness, contrary to general usage, the *intention* (*Absicht*) of the executor of the action (§ 119). Thus the *purpose* of the Leblanc-process is to create soda.⁷ Since this process inevitably also creates chlorine-hydrogen, something the chemist or producer has to be aware of, this fact is included in the *intention*. The production of chlorine-hydrogen is not actually purposed, but it is accepted light heartedly.

Action is always the acting out of one's own free will. Hegel establishes that we can act out of our own free will if two complementary conditions are met:

⁶ Hegel, G.W.F. *Rechtsphilosophie*. All translations are our own, but are based on the translation by T.M. Knox 1952.

⁷ The relationship between the production of soda and its joint product chlorine-hydrogen is discussed in general in Faber, Manstetten, Proops 1996, 268-269 and examined in detail in Faber et al. 1996.

1. I must know what I do. I must therefore be capable of monitoring my actions and their necessary consequences. Should I be prevented by something or someone from monitoring these consequences, I do not know what I am doing and am not free in my actions.

2. According to Hegel, however, something similar to a claim exists, which the consequences of our actions have on us. Namely, they place the claim on us that they are known and therefore actions intended by us. Put differently, they place the claim that we assume responsibility for them.

Hegel calls claims of this kind 'rights'. Thus he speaks in case 1. of the "rights of intention" and in case 2. of a complementary "right of the objectivity of the action to assert itself as known and intended by its subject as a consciously rational being" (§ 120). For our example of the Leblanc-process this means that the producer has the obligation to know that, apart from soda, chlorine-hydrogen with all its harmful effects also emerges.

Hegel's discussion of intention explicitly creates a correlation between responsibility and the problem of knowledge. The right of responsible behaviour is the right to know. And he who has a responsibility also has the obligation to know - to know what his own actions and what their consequences are.

2. Responsibility for Knowledge

Whoever wishes to act responsibly can only do so insofar as he has knowledge pertaining to his actions and their consequences. For only then can he know what he is doing. The question of responsibility therefore includes the questions: what can we, and what must we, know? A further and closely related question is: What do we not know and to what extent can we reduce our ignorance (Faber, Manstetten, Proops 1996, chapter 11)?

With regard to the knowledge required by responsibility, one can differentiate between factual and normative dimensions of knowledge.

(i) We have already discussed the factual dimension of knowledge: One needs knowledge, not only pertaining to the action itself, but also to the consequences and thus, the end result.

(ii) The normative dimension of knowledge deals with knowledge pertaining to whether the action can be classified as 'good', or at least, not morally dubious. For only then can one take responsibility for the action. As a rule this question is addressed against the background of moral principles.

Factual and normative knowledge are different dimensions which separate disciplines are concerned with. Factual knowledge is the domain of natural and social sciences, while normative knowledge is assigned to disciplines such as Practical Philosophy, Political Philosophy, Moral Philosophy and Ethics. Normative knowledge is dealt with by normative economics as well.

To what extent are these fields autonomous from each other, or to what extent is normative knowledge dependent on factual knowledge? One philosophical doctrine postulates the complete dependence of normative knowledge on factual knowledge. This is so-called consequentialism, which judges the moral quality of an action completely on the grounds of its consequences (cf. Spaemann 1989: 157-171). If these are on the whole good, then the action is deemed good. Should they be overall negative, then the action is to be rejected.⁸

Other moral-philosophical approaches do not address the question of the moral quality of an action from the viewpoint of its consequences. In Kant's Moral Philosophy, for example, there exist actions which are inherently good or bad. Thus for Kant a lie, for instance, is always reprehensible, no matter what its consequences may be (Kant 1983a). Yet even for Kant it is not possible to judge an action entirely without taking its consequences into account. A case in point is that no action can be labelled 'good', if only negative consequences are to be expected of it.

In order to judge actions on an ethical basis, therefore, knowledge pertaining to whether the consequences are good or bad is of crucial importance. Thus an individual who wishes to act responsibly is obliged to obtain such factual and normative knowledge. Responsibility in general, therefore, entails responsibility for one's knowledge; more precisely, a responsibility in regard to the prescience of consequences - in our aforementioned example, for the emergence of chlorine-hydrogen during the production of soda.

According to Hegel, however, the obligation of obtaining knowledge extends only to the necessary and not to the chance consequences of an action. Admittedly (as Hegel also recognises) it is often not possible to distinguish with absolute clarity between necessary and chance consequences (§118). Such a clear distinction is generally not necessary, however.

In light of the modern environmental crisis, the problem of the distinction between necessary and random consequences poses itself in a different manner than for Hegel. The demands which the modern environmental crisis burdens us with are examined by the philosopher

⁸ This moral evaluation of actions is what Wieland calls "consequence based" (1999:52, our translation.)

Hans Jonas in “The principle of responsibility” (1979)⁹. In light of the enormous ramifications of our technological activity, Jonas declares knowledge to be a “most urgent obligation” and that this knowledge “must be of equal dimensions to the causal scale of our activity” (1979: 28). This means that our knowledge must be able to keep up with the consequences of our activity. Such “dimensional equality” is, however, all but impossible to achieve. The reasons for this are “the complexity of social and biospherical totalities which mock all mathematics; the unfathomable nature of mankind, forever lying in wait with surprises; and the unpredictability, that is to say, the non-pre-inventibility of future inventions” (1979: 66). The demand for prescience of the consequences of our actions cannot be met in the modern industrial civilisation. Thus we must make do with naught but knowledge regarding the possible consequences (1979: 67) if indeed we can foresee only a part of the actual consequences. Our guide should be a “heuristic of fear” rather than a “principle of hope”.¹⁰ For we know far better what our worst evil is, than we might recognise our greatest virtue (1979: 63).

What Jonas is proposing is a form of ‘ethics of knowledge’ under the restriction of inevitable ignorance. But what can we know and where lie the limits of our knowledge? Jonas remains relatively ambiguous with regard to these questions. The concept of joint production, however, allows us to define more precisely what degree of knowledge about the consequences that can actually be achieved. At the same time it can be used to demonstrate to what extent Hegel’s distinction between necessary and chance consequences no longer suffices for a determination of the limits of our responsibility.

3. Joint Production and Ignorance

As mentioned above, the term joint production is derived from the circumstance that, during the production of a certain substance joint products are also produced. With regard to these joint products, one can make a threefold distinction:

- 1: With regard to joint products we distinguish¹¹ between:
 - a) identified and
 - b) unidentified products.

⁹ Jonas, Hans: “Das Prinzip der Verantwortung” All translations are made by us.

¹⁰ See: “Das Prinzip der Hoffnung” (“The Principle of Hope”) by Ernst Bloch (1959) to which Jonas’ “The Principle of Responsibility” constitutes a critical counter.

¹¹ The following distinctions are of a conceptual nature and form a complete disjunction. In reality there occur many products and consequences of products which are not identified or not identified in an absolute sense, but only to a certain degree.

2: With regard to the identified joint products we distinguish between:

- a) identified and
- b) unidentified consequences or effects.

Whereas the distinctions 1. and 2. are made on a scientific basis, the following third distinction is an economic one.

3: There exist

- a) desired and
- b) undesired joint products.

An example for a desired joint product would be mutton as a joint product of the wool of sheep. In contrast, an example for an undesired joint product would be the dioxine which arises from the burning of waste.

All these distinctions have relevance for the question of knowledge and ignorance. With regard to the first two distinctions the relevance is so explicit as to be almost trivial: identified joint products and consequences or effects belong in the domain of knowledge, ignorance on the other hand exists in regard to unidentified joint products and effects.

The distinction between desired and undesired joint products can also be linked to the problem of knowledge. This link is less obvious, but possibly more significant. At first glance the problem of ignorance does not seem to arise in regard to the question of desirability of products. It seems perfectly obvious, seeing as one knows for oneself whether one desires something or not, that one would also know whether one prefers the existence of a product to its non-existence or vice versa. Such knowledge does not exist, however, when one takes the dimension of time into account. A joint product which is desired today may become undesirable after a certain time-span or vice versa.¹²

A product's transition from desirability to undesirability can arise for a number of reasons. It can be 1) put down to the discovery of previously unidentified effects which can be perceived as either positive or negative. Or it can be 2) the result of a shift in preferences. Finally, it is also possible that 3) a previously undesired joint product can become a desired one for the reason that a new technology has been developed which allows it to be used as a pre-product. A case in point is the free chlorine which can be extracted from an undesired joint product of soda production, namely the chlorine-hydrogen. In the past the demand for free chlorine rose so sharply that over the course of time it actually became the main product and soda the side

¹² The economic implications of such ambivalence was analysed by Baumgärtner 2000, 2002. For a case study of the wastepaper market of the Federal Republic of Germany see Winkler and Baumgärtner (2003a, 2003b)

product. On top of this, chlorine chemistry came up with a number of different ways of developing useful chemical compounds such as polyvinyl-chlorine (PVC).

Such a transition in the desirability of a joint product can generally not be foreseen or predicted. Ignorance therefore exists with regard to this. Would it, however, have been possible to transform this ignorance into knowledge?

With regard to joint production we find ourselves confronted with various forms of ignorance. Let us first examine unidentified joint products and unidentified consequences, be it of identified or unidentified joint products.

Baumgärtner/Schiller (2001) define a joint product as a necessary concomitant of a certain production process. The same applies to the effects these joint products entail. They, too, arise by necessity. With regard to joint production and its consequences, we are therefore dealing with scientifically identifiable correlations which are, in principle, knowable.¹³ That which hinders us from knowing all these things, and the interrelations between them, is the limit of our means of perception, our inattentiveness, as well as the difficulties of communicating that knowledge which a society has accumulated between separate research institutions and individuals. Viewed in this manner, the hole in our ozone layer and global warming through greenhouse gasses should not come as a surprise: each would have been completely predictable, given a certain research effort and – eventually unlimited – scientific capabilities.

With regard to identified joint products and the effects of joint products, our knowledge is limited. We can, however, keep moving the borders between our knowledge and our ignorance further and further into the domain of ignorance. We can keep transforming ignorance into knowledge, even if we cannot hope to ever finalise the procedure.

The situation is slightly different with regard to the desirability or undesirability of joint products. Let us again examine the three cases in which the desirability of a product might change.

To 1) The desirability or undesirability of products and joint products can be modified by the discovery of formerly unknown corollaries of such products or joint products. In this respect the desirability of products or joint products would seem to depend on scientifically observable facts – facts which could be formally described in the form of a function. This is, however, misleading. For the desirability or undesirability of products does not depend directly on physical circumstances, but rather on *whether* and *when* they are identified and

¹³ We use at this point the expression “scientifically identifiable correlations” in a deterministic sense and leave the problem of natural indeterminism.

made known. However, such identification is not foreseeable in the same manner as the joint products themselves or their consequences.

To 2) and 3) The same is true for the other two cases in discussion: a shift in preferences or the introduction of new technologies – in both cases no predictability exists. New technologies derive from inventions and inventions are, by definition, unpredictable. This holds equally for the shifting of preferences. The shifting of preferences as well as inventions must be conceived as free, spontaneous human actions. These actions cannot be directly derived from the circumstances of their emergence. The shift in preferences as well as inventions have the characteristics of novelty and originality. The same applies to the progress of human knowledge with regard to nature's causality. Knowledge and its progress, as well as the shifting of preferences and inventions, are not phenomena of nature, but of the mind. They do not only place limits on our prognostic knowledge in the manner in which the complexity of nature's causality does, but also draw a delimitation. Such intellectual phenomena are their own source of causality and cannot become the object of prognostic knowledge.¹⁴

Let us recapitulate. While we can investigate unidentified joint products and the unidentified consequences of joint products ever further, with regard to foresight, we find ourselves faced with insurmountable obstacles.

We wish to relate these reflections on the possibilities of knowledge to the problem of responsibility and the aforementioned differentiation between the necessary and the chance consequences of actions, as made by Hegel. According to this differentiation, it is solely the necessary consequences which one must assume responsibility for, while ignoring the chance ones. The phenomenon of joint production, however, casts a shadow over this. We explicate:

The necessary consequences of joint production are the joint products themselves, along with all the further consequences they entail, be they identified or unidentified. However, the complexity of nature's causality suffices to make it impossible to truly take all necessary consequences into account (that is to say, every single joint product and each and every one of their consequences). As demonstrated above, our knowledge is inevitably limited. A chance consequence of joint production, however, refers to whether the joint product in question is desired or whether it will be desired in the future or not. For the desirability of a joint product is only partly determined by physical correlations. Yet whether a joint product is desired or

¹⁴ The differentiation of limits and delimitation belonging to our ignorance goes back to Immanuel Kant's "Critique of Judgement". There (§80) Kant argues that our mind is in regard to the perception of "natural purposes" (organisms) "not only very limited, but definitely delimited" since the evaluation of organisms can only occur on the basis of a "teleological principle" which is not a principle of the mind, but of judgement (Kant 1983b: 537 - our translation).

not is a crucial aspect of whether or not one can assume responsibility for a specific production process or not.

In light of the significance of knowledge and ignorance for the assuming of responsibility, we wish to elucidate several categories of ignorance and the dynamics of the transformation of ignorance into knowledge.

4. Categories of Ignorance and the Transforming of Ignorance into Knowledge

In a first differentiation, ignorance can be divided into open and closed ignorance.¹⁵ One is dealing with closed ignorance when one does not know that one is ignorant. In other words, one has no knowledge as to one's own ignorance. In the case of open ignorance, this ignorance has been transformed into knowledge: one knows what it is that one does not know.

Open ignorance can be further differentiated according to whether it is reducible or not.

Reducible ignorance can be divided into individual and social ignorance. An individual can reduce his ignorance by learning; a society uses scientific research to transform its ignorance into knowledge. In the following we wish to capture under the expression 'social knowledge' all knowledge which a society has accumulated. That does not, however, necessarily mean that each individual member of society has access to this knowledge. This entails that individual knowledge is always smaller, or at least never greater, than social knowledge.

Irreducible ignorance can be differentiated as well. On the one hand, we have ignorance which can be blamed on the huge complexity of the object of research. On the other hand we have ignorance which is derived from the unexpected emergence of novelty.

Now, in what relation do these categories stand with regard to the concept of joint production and our previous reflections? In principle, the concept of joint production lends itself to the process of transforming closed into open knowledge. For according to thermodynamic considerations it follows that all production is ultimately joint production.¹⁶ Thus the awareness of joint production demonstrates to the producer that every form of production necessarily entails joint production (this is to say, at least *one* joint product) and, moreover, also entails effects. The producer can attempt to reduce his ignorance implicit to joint production through learning; society can reduce its corresponding social ignorance through scientific research.

¹⁵ To the following see: Faber, Manstetten, Proops 1992.

¹⁶ See Faber et al. (1998), Baumgärtner and Schiller (2001), and Baumgärtner and Arons (2003).

As demonstrated above, however, joint production also contains an element of irreducible ignorance; in fact, we are dealing with irreducible ignorance belonging to both aforementioned categories. Thus (a) the complexity of scientifically researchable natural causality often makes it impossible to identify all joint products and every one of their effects. And (b) whether a joint product is desirable or not in the long run depends on phenomena with the characteristic of novelty (namely changes in preferences and technological inventions). Thus ignorance with regard to the desirability of joint products is not completely reducible.¹⁷

5. Specification of Responsibility in the Environmental Field by Means of the Concept of Joint Production.

In light of our reflections thus far we can now proceed to offer arguments which speak in favour of the *heuristic of fear* put forward by Jonas (in contrast to a *principle of hope*). ‘Heuristic of fear’ means: when we are involved in something which has serious and far-reaching effects, which we cannot entirely foresee at the present moment, we cannot be guided by hope with regard to some good outcome which might possibly occur as a result of our actions. Rather, the heuristic of fear demands of us that we ask before we act: “What could be the worst case scenario?” In doing so, we must take into account that we will never be able to foresee each and every one of the relevant consequences of our actions. In keeping with the principle of responsibility we may never trust entirely in our knowledge to date.

Since we can never content ourselves with our knowledge to date, knowledge becomes an obligation (Jonas 1979: 28). This entails that our responsibility does not extend solely to the consequences of our actions in the past. Responsibility includes the obligation to do something specific in the future: we must, to the best of our ability, strive to know what the consequences of our actions are and will be. In doing so, however, we must never forget that we will never be able to foresee each and every one of them.¹⁸

These ‘ethics of responsibility’, with their obligation to knowledge, can be given concrete content by means of the concept of joint production. One assumes responsibility in the way Jonas addresses it, when one is always aware of the fact that all production is joint

¹⁷ Therefore the phenomenon of joint production “could still give rise to unanticipated and unwanted environmental effects” (Baumgärtner, Dyckhoff et. al. 2001: 369).

¹⁸ In this sense, one can say, that the “perspective of joint production” “gives additional support to applying the precautionary principle” (Baumgärtner, Dyckhoff et. al. 2001: 370).

production.¹⁹ In doing so one brings to mind that every production process generates at least one unintended joint product, one which we might well not have identified yet. In this manner, the concept of joint production lends itself to transforming closed ignorance into open ignorance - namely by means of developing knowledge with regard to how ignorant we are. Such a concept challenges us to obtain knowledge of the unidentified joint products of our actions. At the same time, the concept of joint production reminds us that, owing to the complexity of the consequences of our actions, we will never be able to obtain an overall view of each and every joint product and the corresponding consequences.

The concept equally implies that: whether joint products become a concrete problem or not, depends significantly on the chance consequences of our actions. A change in preferences and the implementation of new technologies can cause undesired joint products to become desired ones and vice versa. However, knowing that irreducible ignorance exists can have an ambivalent effect. It can cause us to take greater care. On the other hand, it can also have the opposite effect: it can lead us to irrationally allow ourselves to be guided by a 'principle of hope' after all. This can become the case if we, faced by evidently unsolvable problems with regard to undesired joint products or their dangerous consequences, choose to depend upon future discoveries to solve these problems and alleviate the dangers brought about by our actions today.

Part III: Individual and Collective Responsibility against the Background of Joint Production

In the previous two parts we dealt in detail with the term 'responsibility' and placed it in context with the phenomenon of joint production. By so doing, it became clear that responsibility is not only a precondition of ethics in the first place – at least insofar as one is free in actions of ethical relevance only if one is responsible for these actions – but is furthermore, an ethical principal in its own right, and can even be regarded as a virtue in the sense of Aristotle.

Responsibility becomes a virtue because the complexity of the consequences of any action which an individual undertakes, is generally impossible to foresee in its entirety. The individual can become a hostage of their own actions insofar as they are not aware of what they are doing. Responsibility as a virtue entails, above all else, the right handling of the ignorance which is inevitably inherent to all action. Such ignorance is a particularly serious

¹⁹ "Inattention to joint production may therefore easily result in ethical negligence." (Baumgärtner, Dyckhoff et.

problem wherever one encounters joint production. In part II we demonstrated how the problem of ignorance in the environmental field justifies what Hans Jonas calls a “heuristic of fear”.

However, up until now, a number of questions have remained to be addressed. We have already intimated that responsibility is by necessity limited in certain ways. According to Hegel, one only bears responsibility for the necessary consequences of one’s actions. We saw, however, that this limitation becomes dubious under the conditions of joint production. If such a limitation is not possible, or at least not always possible, then one must wonder whether there exist different types of responsibility – those that are more strictly limited, and those that are less so. At the same time one must clarify to which subject each type of responsibility refers.

In the following we shall begin by differentiating four types of responsibility: legal, ethical, political and political-ethical responsibility (section 1). It will become clear that political-ethical responsibility is the most comprehensive and that the individual who is to bear it can only be conceptualised on the basis of the *homo politicus* hypothesis. To him in particular, responsibility as a virtue is to be ascribed (section 2). On the basis of these classifications, perspectives for environmental politics under the conditions of joint production can then be sketched. Hereby, special significance shall fall on the relationship between the responsibility of the economic agent and that of the politician (section 3).

1. Types of Responsibility

As mentioned above we can differentiate between four types of responsibility, each of which must be considered under the following aspects: for whom, toward whom (or toward which authority) and in which regard (or according to which measure) responsibility must be assumed. We shall begin with the sphere in which responsibility can be most clearly defined: that of law.

1.1. Legal Responsibility

Legal responsibility entails that the consequences of our actions rebound on us, in other words that there are certain forms of feedback, on the basis of which one is “called to account for the consequences of one’s deeds” (Wieland 1999: 26, our translation). Sanctions of the legal system “guarantee that certain consequences of his deeds rebound onto the enactor.” (ibid.)

al. 2001: 369).

Such feedback consists of either sanctions for violations of legal rulings or liability for damage which one's actions cause to others. Such liability can refer to occurrences which are at best indirectly associated with one's own actions. Thus parents are liable for the actions of their children and the owners of an automobile for damage caused by that automobile, even if it is not directly their fault (for example, if it should catch fire and cause a major accident). An individual bears responsibility, in a legal sense, toward whichever authority passes laws and enforces them. The measure of his responsibility is the legal system. Under such a legal system, it is possible to define and delineate responsibility very precisely so that an individual can be relatively certain of what to expect.

1.2.Ethical Responsibility

The emphasis of ethical responsibility lies not on the consequences of one's actions, but on the actions themselves. If we act freely, then we are responsible for our actions. Should these actions be good, then they are responsible – as long as they are compatible with our ethical principles (whatever these may be). Otherwise, our actions are bad and subject to reproach. Should our ethics be ethics of virtue, then we must assume responsibility not only for our actions, but also for our attitudes and habits and be prepared to justify them with respect to our ethical principles. These principles constitute the measure according to which we bear responsibility. In contrast, the authority toward which we bear such responsibility can be defined in different ways: we can bear responsibility toward ourselves or toward 'our own humanity' or toward moral society as a whole.

Ethical responsibility differs from legal responsibility in that the purpose or the intention of the individual plays a central role. An action which only outwardly appears to be compatible with ethical principles, yet is motivated by an egoistic eye for profit, is still ethically reproachable. However, this emphasis on the correct intention by no means entails that the consequences of one's actions can be left entirely out of the picture under the aspect of ethical responsibility. For the correct intention includes that one takes the consequences into account and thus, no action can be labelled 'good' from which negative consequences can be expected with certainty, or at least with a particular probability. There exist, as far as we can see, only two exceptions to this rule: 1. the evil is justified by a higher ethical principle in the manner in which punishment is justified by justice, and 2. the evil is balanced or compensated by a higher good so that one can justify accepting or condoning it. This second limitation holds only under certain circumstances, however. According to the ethical doctrine of Utilitarianism alone, is an action always considered good if and only if it causes more good than bad.

Ethical responsibility shares with legal responsibility the characteristic that, as a form of responsibility for the consequences of one's actions, it is a limited form of responsibility. While law itself draws the limits for legal responsibility, in ethical responsibility Hegel's differentiation between necessary and chance consequences finds its place: as a rule I must only assume responsibility for that which follows by necessity from my actions and which I can simultaneously overview. In this sense Kant also declares: should I act correctly, then I need bear no responsibility for that which follows from my actions by chance (Kant 1983a: 639). Chance actions and deeds, however, can be those which derive from the will of another person, especially if this should be evil. I am not responsible, for their deeds even if a truthful piece of information given by myself should have made the deed possible in the first place.

Legal and ethical responsibility therefore, generally only refer to a single individual. Responsibility in this sense means responsibility for the consequences of an action (see above: part I; section 1, (i)) and such responsibility is always limited. In the first case it is explicitly limited by law itself, whereas in the case of ethical responsibility an unambiguous differentiation between the necessary and the chance consequences of an action may be impossible to make. In this sense it is also of significance that a temporal limitation or restriction of responsibility can exist. In legal terms this takes the form of the statute of limitations: one cannot be made liable (or, in other words, legally responsible) for the consequences of actions which only appear or become enforced after a certain time period has elapsed.

1.3. Political Responsibility

Political and political-ethical responsibility differ from the forms of individual responsibility in all the points mentioned above. Thus responsibility in this new sense refers not primarily to responsibility for the consequences of an action, but rather to a form of responsibility for a state of being, for example for the preservation and well-being of a political community. This constitutes an elimination of the limits of responsibility with regard to consequences. Thus, responsibility must be assumed for all foreseeable consequences which could be significant for the preservation or well-being of the state of being in question. Moreover, the subject which must assume responsibility is no longer simply a single individual. We are dealing rather with a collective, a community – or perhaps an individual who regards himself as a member of said community and is acting on its behalf.

Political responsibility is borne by all who take part in political activity. Political activity is the realisation of the interests of a political community, for example, a state. We credit political activity with the capability of preserving such a community and simultaneously shaping the world around us. Political activity is also the application and realisation of power. Insofar as we ascribe power to an individual in a political sense, we burden him with responsibility for the consequences of all he does. Such political responsibility appears to be unlimited insofar as one who bears it, is furnished with power to guide the fate of the political community. With respect to this fate at least, the differentiation between necessary and chance consequences is abolished. This can be demonstrated by the example that a government is always held responsible for the state of the economy, even if this state is only partly (and that means by chance) a consequence of the government's own doing. Phases of prosperity are equally accredited to the government as recessions. A politician who wishes to live up to his calling must have good fortune.

It is furthermore significant that political responsibility appears to know no temporal limitation. Whether a politician has successfully reformed a political community or has effected its long-term collapse, can only become discernable after several generations. How this case is evaluated, however, usually determines the view we have of said politician.

1.4. Political-ethical responsibility

Political responsibility is derived from the experience that those involved in the political process have, and exert, power. They are measured by the application of such power and by the realisation of the goals which are ascribed to them: in other words, by their success. Above all else, one assumes that the goal of such an individual be the preservation, the ascendancy and the well-being of his political community. The conceptual content of political responsibility is, however, one-sided insofar as it is orientated solely toward success, but never asks about the means with which such success is achieved. We can, however, demand of political activity itself, that it fulfils both concepts. If we wish to evaluate political responsibility along such lines, then we arrive at the notion of a "totality of responsibility" as Jonas developed it (1979: 189). Responsibilities have totality as they "encompass the total state of being of their objects, that is to say every aspect of it, from their naked existence to their highest interests" (ibid. our translation). We wish to label this form of responsibility political-ethical responsibility and it refers not only to the preservation and prosperity of community, in other words to the *common good*, but also to the notion of *justice*. Justice, which belongs to the 'highest interests' of the community, includes at least the democratic

principle, the rule of law, the guarantee of human rights, and also the preservation of the possibility to act politically.

Thus political-ethical responsibility orientates itself on the characteristics of common good and justice. It is therefore truly the most comprehensive of all those we have dealt with. This, however, raises the possibility that stipulations of common good and of justice might come in conflict with one another – a conflict which may be irreconcilable and unsolvable. A war, however legitimate and necessary it may be, always entails innocent victims. Such conflicts are of a tragic nature and, in the sense of Max Weber's ethics of responsibility, it becomes clear that the tragic nature of certain conflicts require our special attention. The concept of ethics of responsibility emphasises the fact that in politics, it is impossible to guarantee the moral integrity of actions by strictly limiting responsibility for the consequences of an action, as Kant and Hegel propose for moral activity. In particular, someone involved in politics can never absolve himself of responsibility for the reaction of his opposite to his own deeds.²⁰

The comprehensive, total character of political-ethical responsibility emphasises another difficulty, which is the complexity of the consequences of an action entails. The power that someone involved in politics ascribes to himself allows him to disregard none of the concomitants of his actions. To a certain extent "the difference between purpose, intent, action, main- and side-consequence is irrelevant" (Spaemann 1977: 180, our translation) to one involved in politics. "And wherever negative consequences arise from his actions, then their elimination is in turn also his task." (ibid.) In this manner, however, he runs the risk of becoming entangled in the consequences of his actions so that in politics "side-effects of actions are processed rather than decisions are made" (Meier 1983: 20, our translation). Thus, however, he who lays claim to power is doomed to powerlessness – he is no longer master of his actions.

This danger appears to be greatest under conditions of joint production. For while in society all concomitants of actions can – with few exceptions – eventually be neutralised or overcome, this is not the case in nature. The consequences, which arise from joint production, are not always, but often, irreversible. The situation is complicated by the fact that ignorance exists with regard to the possible joint products themselves, their consequences and their desirability in the future. And so there is a danger that an individual becomes a prisoner of the

²⁰ Thus Max Weber's ethics of responsibility are not a consequential ethical concept, which seeks to justify the means with the end. However, since Weber is often ambiguous and misleading on this topic, ethics of responsibility are widely understood as "a consequence-based concept of legitimisation, according to which decisions are not justified by intentions or individual consequences, but by the aggregate of all foreseeable consequences" (Wieland 1999: 56, our translation).

side effects and joint products of his action, and is completely absorbed with the elimination of undesired joint products and neutralisation of undesired effects. He would then no longer be acting, but only reacting.

A good example for this danger can be found in the case of atomic energy. Here radioactive material is produced which must be stored or disposed of over generations, thus placing long-term obligations on politicians. The dangers of these radioactive joint products, and the extent of the measures which must be taken to deal with them, can hardly be ignored. The use of atomic energy thus endangers the good of a political society, as well as its ability to act – in other words, its ability to assume responsibility for its own actions.

And that is not all: atomic reactors can become the objective of terrorist attacks which would have terrible consequences. This possibility suddenly allows us to once more clarify the difference between ethical and political-ethical responsibility. In Hegel's sense a terrorist attack on an atomic reactor is a chance consequence of a political decision in favour of nuclear energy. As a deed brought about by an evil will, the politician in question need not assume responsibility – in the ethical sense of the term explicated above – for such an attack and its consequences. In the political-ethical sense, however, precisely this does not hold. It is not solely the terrorist himself who is responsible for the attack and its consequences, but equally those who assumed responsibility for the political decision in favour of atomic energy.²¹

2. Political-ethical Responsibility and the Homo Politicus

Political-ethical responsibility places the highest demands on people because it is the most comprehensive form of responsibility. Yet how must we define the political individual if he is to be regarded as someone capable of living up to such responsibility? In several papers

²¹ The sociologist Ulrich Beck recognises a general tendency of modern societies to sacrifice a part of the range of their possible actions through unrestrained joint production. Beck therefore calls modern society a “risk society” (Beck 1986). In a sociological sense ‘risk’ denotes the danger of emergence of undesired and hazardous events, whereby said danger is the result of one’s own actions. The “social production of risks” is an inevitable auxiliary of the “social production of wealth” (25). Insofar as one understands the production of risks as material environmental damage (part I), the expression ‘risk’ can easily be translated into the terminology of joint production. ‘Wealth’ can on the one hand be regarded as the quintessence of all intended and trivially desired products, and ‘risk’ as the quintessence of all possible undesired joint products and their consequences on the other. As in the case of joint production, the risks of the risk society also includes the problem of ignorance (35) in regard to the “danger of concomitants” (27) – in regard, therefore, to which undesired joint products arise. The question of responsibility also arises in regard to the production of risks (43), namely the question of responsibility for the procurement of the best possible knowledge about possible risks (or joint products). According to Beck a “general lack of responsibility” (ibid.) is predominant in society which views risks as “negative goods which are until further notice postulated as being non-existent.” (45) (All quotations translated by us.)

(Faber, Manstetten, Petersen 1997, Petersen, Faber 2000, Faber, Petersen, Schiller 2002) we have stated that the political individual is to be conceived of as a *homo politicus*. The *homo politicus* never acts only in his own interest. Rather, he views himself as part of a community. He always acts for the community; what he undertakes out of his own initiative is always orientated toward common activity and common decision-making. As a *homo politicus*, an individual involved in politics always orientates himself toward the demands of common good and of justice. At the same time, he is characterised by the capabilities necessary to successfully pursue these goals. We have therefore described the *homo politicus* as someone possessing certain virtues, whereby we regard virtue as a capability, as a sort of virtuosity in the sense of Aristotle: justice itself, courage, temperance, as well as practical wisdom or phronesis (Faber, Manstetten, Petersen 1997: 471). We can now ascribe a fifth virtue to the *homo politicus*, namely that of responsibility in the sense in which we have developed it in part I, section 3.

Before the background of political-ethical responsibility, the virtue of responsibility can be defined as the ability to decide which actions one can assume responsibility for. That is to say, the *homo politicus* must be able to live up to the stipulations of justice and common good, while at the same time managing to retain the possibility of acting politically. He is therefore also responsible for being able to continue to assume political responsibility.

Thus, the *homo politicus* must on the one hand strive to avoid the danger of becoming enmeshed in dealing with the concomitants of his actions, thus becoming no longer the master of his actions. On the other hand, he must take care that his actions do not endanger the common good or violate justice. Political activity of a political community or the *homo politicus*, is always powerful activity which intervenes in the world, changing and shaping it. For the very reason that the *homo politicus* as the bearer of political-ethical responsibility cannot limit his responsibility, he must limit his own actions, namely the exercising of political power. He must limit it under the provisions of his responsibility in the abstract sense, namely according to that which he can assume responsibility for. Regarding environmental politics this means: activity which changes the environment or nature must also be limited. And in this case, it is not only political activity itself which must be limited, but (in an appropriate manner) the activity of economic participants – which after all, particularly intervene into the environment and nature.

So how can the *homo politicus* live up to his responsibility? He is subject to the conditions of irreducible ignorance. Irreducible ignorance exists not only in social affairs, in other words in

the relationships between people, but also in the sphere of the relationship between man and nature. This was demonstrated in our discussion of joint production and ignorance in part II.

Under the conditions of irreducible ignorance there are no concrete, universally valid rules for how to act. In order to decide what one can assume responsibility for, and what not, requires practical wisdom (*phronesis*). For this reason, we have defined responsibility as a virtue. In the field of environmental politics, however, this virtue must meet special requirements.

Environmental politics cannot do without scientific expertise: the politician is therefore dependant on science without this lessening his responsibility. Environmental politics “must strive to achieve the highest possible level of information with regard to the consequences of its measures” (Spaemann 1977: 180, our translation). Yet, as demonstrated by the phenomenon of joint production, science cannot completely eliminate all ignorance with regard to the environmental effects of political decisions, but only hope to reduce these within certain restrictions. Thus political activity in the field of environmental politics requires a specific form of practical wisdom with regard to scientific findings. From one involved in politics we must therefore expect a certain level of scientific proficiency. He need not be a scientist himself. But he must be able to understand how scientific findings or recommendations come about. On the other hand, one must also demand of science that it assume political responsibility to a certain extent. It shares responsible for informing society about the environmental effects of measures taken, and about that which it does know, that which it can know and that which it cannot know.

3. The Responsibility of the Economic Agent

The question of individual and collective responsibility under the conditions of joint production would not be adequately examined if we did not ultimately turn our eye to the specific responsibility of the economic agent. For it is actually far less politics than the activity of the economic agent, be he producer or consumer, that intervenes into nature and gives rise to identified as well as unidentified joint products with all their consequences. The individual economic agent, however, is not capable of monitoring all these consequences – be they necessary or chance consequences of his actions – and thus not able to assume responsibility for them. For in order to be able to take part in economic activity in the first place, the agent must be able to keep an overview over the consequences of his actions for which he may have to account or be made liable for. The responsibility for the consequences

of his actions must be limited if he is to calculate them according to cost-benefit aspects, which is essential for economics.

Therefore the economic agent, if he is to be economically successful, cannot assume responsibility for all the relevant consequences of his actions. For he can firstly not foresee them, and secondly would be completely overburdened with their neutralization. He can, therefore, not be held accountable for the (in our sense) most significant consequences of his actions. If, however, we take into account the necessary connection between responsibility and freedom explicated in part I, this means that under the conditions of joint production the economic agent is free in a limited sense only. The responsibility which he cannot assume for himself must be assumed for him by politics. It is therefore politics which must also decide inside which boundaries the agent must assume responsibility himself and which consequences this entails.

This (limited) responsibility is therefore assigned politically. In defining this responsibility we wish to orientate ourselves along the lines of the representation of a system as described (above in section 2 of part I, and in more detail by Baumgärtner, Schiller 2001: 368 [representation of a system]). Such a system representation takes only a certain portion of all joint products and consequences into account. Regarding the politically assigned responsibility of the economic agent, this means: the agent is assigned a specific system representation according to which he must take into account or assume responsibility for joint products and their consequences in his production, consumption or waste disposal.

For harmful or undesired joint products ‘taking into account’ can mean:

1. the product must not be created,
2. if it is created, it must be transformed into something non-harmful (such as sulphur-dioxide into plaster),
3. it may only be created in certain amounts, or
4. a fee is to be paid for the production of a joint product.

Whatever the economic agent cannot assume responsibility for falls back to politics. Ultimately it is the political system which remains responsible for the political community as a whole and for the natural foundations of its existence.

Part IV: Summary and two Conclusions

In this paper we have developed a new perspective on environmental politics which is equally relevant for politics as a whole. This perspective was derived from referring an expression which has its place in the humanities and Practical Philosophy, that of responsibility, to the natural, scientific phenomenon of joint production. Hereby, among other things, it became clear that responsibility and joint production display significant terminological analogies.

Above and beyond this analogy it became clear that the phenomenon of joint production places new challenges on responsible human activity. This particularly holds for politics and those involved with it, who bear the most comprehensive form of responsibility. As we demonstrated in part III, politics is always at risk of arriving at a tragic conflict or becoming entangled in the complexity of the consequences of its actions (see part I). This danger arises chiefly from the fact that our activity is subject to conditions of irreducible ignorance (see part II).

The particular dangers of political activity are nothing new. Yet, for a long time, these dangers had only been taken into account in social affairs, that is to say, in the relationship of people to one another. Something different appeared to be the case with regard to our relationship to nature: either we are subject to natural phenomena and at her mercy, or we control these phenomena and thus reign over her. Singular problems for responsible behaviour did not seem to arise in either case. The concept of joint production shows us, however, that both views of our relationship to nature are misleading. We are neither simply subject to nature, nor are we her sovereign lords. In the course of our production we intervene into nature and subjugate her. By simultaneously giving rise to joint products with every product we produce, however, we instigate natural processes which are beyond our control. We act, as Hannah Arendt put it, “into nature” and nature responds as an autonomous opposite.

This leads to two important conclusions:

1. The same problems confront politics in the field of the natural environment as in the social field. Politicians find themselves confronted by an unmanageable complexity of the consequences of its actions. This circumstance is even more momentous in the field of nature than in social affairs, since interventions into nature are often irreversible. Only the wounds of the spirit heal, as Hegel put it, without scars.
2. The great responsibility which results from the phenomenon of joint production is borne not only by politics, but by the economic agent. For in a modern economy it is above all he

who produces, thus intervening into nature. Current economic theory takes the importance of this responsibility far too little into account. Yet this responsibility is always too great for the individual economic agent. It remains a problem of politics. Politics, science and the public, must find a way of dividing up the enormous burden of responsibility which arises from economic activity through the phenomenon of joint production, between politics and the individual economic agent.

References:

- Arendt, Hannah (1981): *Vita Activa oder Vom tätigen Leben*. München: Piper [Orig. 1967].
- Aristotle, *Nicomachean Ethics*, translated by David Ross (1925): Oxford University Press.
- Baumgärtner, Stefan (2000): *Ambivalent Joint Production and the Natural Environment. An Economic and Thermodynamic Analysis*, Heidelberg: Physica Verlag.
- Baumgärtner, Stefan (2002): *Thermodynamic of waste generation*. In Bisson, Kathy and Proops, John (editors), *Waste in Ecological Economics*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- Baumgärtner, Stefan/de Swan Arons, Jacob (2003): *Necessity and inefficiency in the generation of waste. A Thermodynamic analysis*. *Journal of Industrial Ecology* 7(2) (forthcoming).
- Baumgärtner, Stefan/Winkler, Ralph (forthcoming 2003b): *Markets, technology and environmental regulation: price ambivalence of waste paper in Germany*, *Ecological Economics*.
- Baumgärtner, Stefan/Dyckhoff, Harald/Faber, Malte/Proops, John/Schiller, Johannes (2001): *The concept of joint production and ecological economics*. *Ecological Economics* 36 (3), 365-372.
- Baumgärtner, Stefan/Schiller, Johannes (2001): *Kuppelproduktion. Ein Konzept zur Beschreibung der Entstehung von Umweltproblemen*. In: *Jahrbuch Ökologische Ökonomik*. Band 2. Marburg: Metropolis, 353-393.
- Baumgärtner, Stefan/Winkler, Ralph (forthcoming 2003a): *Preisambivalenz von Altpapier. Eine ökonomische Konsequenz der deutschen Abfallgesetzgebung 1985 - 2000*, *Zeitschrift für angewandte Umweltforschung - Journal of Environmental Research*.
- Beck, Ulrich (1986): *Risikogesellschaft. Auf dem Weg in eine andere Moderne*. Frankfurt am Main: Suhrkamp.
- Bloch, Ernst (1959): *Das Prinzip Hoffnung*, Frankfurt am Main: Suhrkamp.
- Downs, Anthony (1967): *Inside Bureaucracy*. Boston: Waveland Press.
- Faber, Malte/Manstetten, Reiner/Proops, John (1992): *Humankind and the Environment: An Anatomy of Surprise and Ignorance*, *Environmental Values*, Vol. 1 (3), S. 217-241.
- Faber, Malte/Manstetten Reiner/Proops John (1996): *Ecological Economics. Concepts and Methods*, Cheltenham UK: Edward Elgar.
- Faber, Malte/Jöst, Frank/Manstetten, Reiner/Müller-Fürstenberger, Georg (1996): *Kuppelproduktion und Umweltpolitik: Eine Fallstudie zur Chlorchemie und zur Schwefelsäureindustrie*, *Journal für praktische Chemie, Chemiker-Zeitung*, 338, S. 497-505.
- Faber, Malte/Manstetten, Reiner/Petersen, Thomas (1997): *Homo politicus and homo oeconomicus. Political Economy, Constitutional Interest and Ecological Interest*. *Kyklos* 50, S. 457-483.
- Faber, Malte/Petersen, Thomas/Schiller, Johannes (2002): *Homo Oeconomicus and Homo Politicus in Ecological Economics*. In: *Ecological Economics* 40, 323-333.

- Faber, Malte/ Proops, John/ Baumgärtner, Stefan (1998) All Production is Joint Production - a Thermodynamic Analysis, in: Silvie Faucheux, John Gowdy, Isabelle Nicolai (editors), Sustainability and Firms, Technological Change and the Regulatory Environment, Cheltenham, UK: Edward Elgar.
- Hegel, Georg Wilhelm Friedrich (1970): Grundlinien der Philosophie des Rechts oder Naturrecht und Staatswissenschaft im Grundrisse. Frankfurt am Main: Suhrkamp [orig. 1821].
- Horkheimer, Max/Adorno, Theodor W. (1968): Dialektik der Aufklärung. Amsterdam: de Munter.
- Jonas, Hans (1979): Das Prinzip Verantwortung. Versuch einer Ethik für die technologische Zivilisation. Frankfurt am Main: Suhrkamp.
- Kant, Immanuel (1983): Grundlegung zur Metaphysik der Sitten. In: the same, Werke in sechs Bänden. Ed. by Wilhelm Weischedel. Band IV. Darmstadt: Wissenschaftliche Buchgesellschaft, S. 9-102 [Orig. 1785].
- Kant, Immanuel (1983a): Über ein vermeintes Recht, aus Menschenliebe zu lügen. In: the same, Werke in sechs Bänden. Herausgegeben von Wilhelm Weischedel. Band IV. Darmstadt: Wissenschaftliche Buchgesellschaft, S.637-643 [Orig. 1797].
- Kant, Immanuel (1983b): Kritik der Urteilskraft. In: the same, Werke in sechs Bänden. Ed. by Wilhelm Weischedel. Band V. Darmstadt, S. 233-620 [Orig. 1790].
- Marx, Karl (1970): Das Kapital. Dritter Band. Buch III: Der Gesamtprozeß der kapitalistischen Produktion. Berlin [Orig. 1894].
- Meier, Christian (1983): Die Entstehung des Politischen bei den Griechen. Frankfurt am Main.
- Petersen, Thomas, Faber, Malte (2000): Bedingungen erfolgreicher Umweltpolitik im deutschen Föderalismus. Zeitschrift für Politikwissenschaft (ZPol) 1/00, 5-41.
- Spaemann, Robert (1977): Nebenwirkungen als moralisches Problem. In: the same, Zur Kritik der politischen Utopie. Zehn Kapitel politischer Philosophie. Stuttgart, 167-182.
- Spaemann, Robert (1989): Glück und Wohlwollen. Versuch über Ethik. Stuttgart: Klett-Cotta.
- Weber, Max (1988): Politik als Beruf. In: the same, Gesammelte Politische Schriften, ed. by Johannes Winckelmann. Tübingen: Mohr, 505-560, [orig. 1919].
- Wieland, Wolfgang (1999): Verantwortung – Prinzip der Ethik? Heidelberg: C. Winter.