Chapter 7
Everybody Has the Right to Do What He Wants: Hans Reichenbach's Volitionism and Its Historical Roots

Andreas Kamlah

7.1 Introduction[1]

When reading Reichenbach, one notices a frequently recurring and puzzling emphasis upon freedom of choice within every possible context: in the philosophy of science, in epistemology, in ethics, and last but not least in the theory of the freedom of the will. We read again and again that *everybody has the right to do what he wants*. This statement has not much to do with epistemology properly speaking, it is rather an unmistakable sign of Reichenbach's *anti-authoritarian ideology.* In his ethics, however, this "anarchist principle" is being modified and clarified to such an extent that (in Sect. 7.5) it can be shown to act as a bridge between his scientific, and political, and social world views.

However, this "anarchistic principle," is modified for ethics in a way that sheds light upon it. Thus natural science becomes here a model for ethics, in a manner analogous to Kant's famous expression about the starred sky and the moral law. Just as the order of nature is, for Kant, a model for the moral law; the conventionality of language becomes, for Reichenbach, a symbol for the absolute—quasi-anarchistic—freedom of human action.

My discussion in the present chapter is not only part of Hans Reichenbach's biography, but about the movement of logical empiricism in general, and about the way how the interpretation of science reflects a certain conception of man.[2] We start with a stock taking in philosophy of science.

[1]I am indepted to Wendy Wilutzky and Lothar Ern for checking my English grammar and style.

[2]For a Biography of Hans Reichenbach see (Gerner 1997).

A. Kamlah (✉)
Institute of Philosophy, University of Osnabruck, Osnabruck, Germany
e-mail: andreas.kamlah@uni-osnabrueck.de

N. Milkov and V. Peckhaus (eds.), *The Berlin Group and the Philosophy of Logical Empiricism*, Boston Studies in the Philosophy and History of Science 273, DOI 10.1007/978-94-007-5485-0_7,

7.2 Taking Stock of Reichenbach's Philosophy of Science

7.2.1 Coordinative Definitions

In his first book *Relativitätsthorie und Erkenntnis a priori* (1920; *Theory of Relativity and a priori Knowledge* 1965), Reichenbach replaced Kant's synthetic a priori principles with "coordinating principles" meant to do the same job, but which can be chosen freely.

In this book classical physics is characterised by the following list of principles:

> "relativity of uniformly moving coordinates," "irreversible causality," "action of contact," "approximate ideal," "normal induction," and "absolute time". (ibid. 15; *GW* vol. 3, 207)

The combination of these principles together with the empirical data, however, does not lead to a consistent description of the world. The special theory of relativity and, soon after it, the general theory of relativity, describe the world with different sets of principles. One year after his first book (about 1921) Reichenbach set out to replace these principles with "coordinative definitions". Herein, he argued that the merits of Einstein's theory of relativity was its replacement of alleged "facts" by "definitions". In *Philosophie der Raum-Zeit-Lehre* (1928; *Philosophy of Space and Time* 1953) Reichenbach's conventionalist operationism is perspicuous. He states:

> The philosophical significance of the theory of relativity consists in the fact that is has demonstrated the necessity for metrical coordinative definitions in several places where empirical relations had previously been assumed. (1928, 26; *GW* vol. 2, 34; 1958a, 15)

Paradigmatic of this achievement is Einstein's definition of simultaneity in his famous paper of 1905, "Zur Elektrodynamik bewegter Körper:"

> [. . .] it is not possible without further assumption to compare, in respect of time, an event at *A* with an event at *B*. We have so far defined only an "*A*-time" and a "*B*-time". We have not defined a common "time" for *A* and *B*, for the latter cannot be defined at all unless we establish *by definition* that the "time" required by light to travel from *A* to *B* equals the "time" it requires to travel from *B* to *A*. (Einstein 1905, § 2)

This definition implied enormous support for Reichenbach's conventionalist operationism. For, if we want to define a concept, we can do this in more than one way. And, every convention can be replaced with another one. Reichenbach does not restrict conventionalism to simultaneity. For him it is valid for all physical concepts, especially for length.

As he argues:

> The problem does not concern a matter of *cognition* but of *definition.* There is no way of knowing whether a measuring rod retains its length when it is transported to another place; a statement of this kind can only be introduced by a definition. (1928, 25; *GW* vol. 2, 33; 1958a, 16)

It is however a fact that, given such a definition, two measuring rods which are equally long at one place in space—and are equal in this respect—are so at other places as well.

> This consideration can only mean that the factual relations may be used for the simple definition of congruence where any rigid measuring rod establishes the congruence. If the factual relations did not hold, a special definition of the unit of length would have to be given for every space point. Not only at Paris, but also at every other place a rod having the length of a "meter" would have to be displayed, and all these arbitrarily chosen rods would be called equal in length by definition. The requirement of uniformity would be satisfied by carrying around a measuring rod selected at random for the purpose of making copies and displaying these as the unit. [...]
>
> Such a definition would complicate all measurements, but *epistemologically it is equivalent* to the ordinary definition, which calls the [rigid] rods equal in length. In this statement we make use of the fact that the definition of a unit at only one space point does not render general measurements possible. For the general case the definition of the unit has to be given in advance as a function of the place (and also of the time). *It is again a matter of fact that our world admits of a simple definition of congruence because of the factual relations holding for the behaviour of rigid rods; but this fact does not deprive the simple definition of its definitional character.* (1928, 26; *GW* vol. 2, 34; 1958a, 17; [the first emphasis in the quotation is my own—A. K.])

Reichenbach used the fact that we have the freedom to choose among several methods of measuring length to show that Euclidian geometry can always be defended provided the measuring method is defined appropriately. However, this does not help the adherents of the synthetic a priori, since most other geometries can be defended in the same way, for example the hyperbolic geometry in which the sum of angles in the triangle is less than 180°. By this argument Reichenbach has reduced to the absurd the efforts of some Philosophers of his time who wanted to save Euclidean Geometry as a priori valid. This was certainly an interesting result of his analysis.

But can one always replace a definition with a different but equivalent one? Let us imagine an alternative definition of length which can replace the usual one such that there does not arise any loss of information. Let us consider a method of measuring length the units of which are 2 m from South to North, and 1 m from East to West with the remaining distances to be determined according to the Pythagorean theorem. Everything in physics which can be expressed in terms of the standard definition, can also be formulated with the aid of the new one. We thus have translated the physical sentences into a new language. Does this mean that the deviant definition is "epistemologically equivalent" to the usual one as Reichenbach says?

This measuring method cannot be applied if the direction of the meridian cannot be determined; that is, if one has no compass. Since if we use a measuring rod we have always to take into account the angle between the rod and the meridian. There are cases in which a certain definition, though it leads to a logically equivalent theory, cannot be applied.

Reichenbach is certainly right when he says that the translation of true sentences into another physical language does not lead to a wrong picture of nature. But "epistemological equivalence" demands more than that. First, it requires the aforementioned equivalence in the applicability of measuring methods. Second, it requires inductive equivalence. That is, it must be possible to detect the inductive

characteristics of theoretical descriptions, which make it more or less simple. A theory, in which all directions in space are nomologically equivalent with respect to the natural laws, is simpler than one in which one direction in space is preferred. If we use an alternative language in which the unit of length depends on the spatial direction, the isotropy is hidden, and it seems as if the theory is lacking this important inductive characteristic, which impairs the epistemological equivalence with the description in the standard language. Consequently, such a procedure is in no way "epistemologically equivalent" to the ordinary method, since it fails in cases where the standard method works very well.

7.2.2 Relativity

Until now we have not yet talked about the *principle of special relativity* which is the central point in Einstein's theory of 1905, but not in Reichenbach's philosophy of space-time. We will see that for Reichenbach this principle simply does not seem to exist at all. That is strange, since Reichenbach claims to tell us the epistemology of just this for him nonexistent theory.

Einstein defines a class of coordinate systems, the *inertial systems*, in such a way that all physical equations are exactly the same in all of them. For a certain set of coordinate systems which can be transformed into each other, by the well known Lorentz transformations, the sentences of physics are written down with the same sequence of signs, regardless of which coordinate system this is done for. In other words, the physical laws are invariant under those changes of coordinate systems which belong to the Lorentz group.

However Reichenbach does not talk about invariance. Is it possible—what is really hard to believe—that Reichenbach did not understand Einstein in the essential point of his special Relativity, the *Lorentz invariance of all natural laws*? To discuss this question I have first to explain in a nutshell what *Special Relativity* means. I start with *Galilean invariance*.

We can describe space time by using a special kind of Cartesian coordinate systems *x, y, z, t*, the so called inertial systems, for which I want to use letters *C*, *C′* etc. A physically possible process *p* in one inertial system *C* can have a physically possible counterpart *p′* which in C′ has the same description as *p* in *C*. This is the invariance of physics with respect to the transformations of the inertial systems into each other. Before 1905 physicists believed that these inertial systems can be transformed into each other by shifting, turning them into other directions, and by the special Galilean transformation

$$x', y', z', t' = x + vt, y, z, t,$$

where *v* is the velocity of the system *C′* relative to *C*, and that the physical laws are invariant under these transformations. Galileo illustrated what later became known as *Galilean invariance* by his famous thought experiment of physical processes in

the cabin of a ship, where everything runs in the same way independent of the ship's velocity.

Einstein discovered that the Galilean transformations have to be replaced with the Lorentz transformations, i.e. with shifts, turns, and with the special Lorentz transformation

$$x', y', z', t' = \beta\,(x + vt)\,, y, z, \beta\left(t + vx/c^2\right) \text{ with } \beta = \left(1 + v^2/c^2\right)^{-1/2}.$$

Thus he had discovered the Lorentz invariance of physics. Later special relativity was replaced with general relativity. But that is another story which I do not want to discuss here.

The Lorentz invariance of physics is the content of Einstein's principle of special relativity. Einstein defines it as follows:

> If, relative to C, C' is a uniformly moving co-ordinate system devoid of rotation, then natural phenomena run their course with respect to C' according to exactly the same general laws as with respect to C. This statement is called the *principle of relativity* (in the restricted sense). (Einstein 1920, section 5)

This definition of special relativity may have its flaws. It can at least benevolently be interpreted in the way in which I have characterized the Lorentz invariance in the preceding lines. This, then, is a property of all physical theories, which certainly has experimental implications. It is the empirical content of the principle of special relativity.

Let us now confront Einstein's principle to that of Reichenbach. He writes:

> The physical core of the theory, however, consists of the hypothesis that natural measuring instruments [in the German original text: "natürliche Messkörper"] follow coordinative definitions different [behave in a way which is different] from those assumed in the classical theory. This statement is, of course, empirical. On its truth depends only the *physical theory of relativity*. However, the *philosophical theory of relativity*, i.e., the discovery of the definitional character of the metric in all its details holds independently of experience. (1958a, 177; 1928, 206–207; *GW* vol. 2, 214)

In his admirable axiomatic system of special relativity (1924; engl. transl. 1969) he can derive the Lorentz transformation for rods and light signals. But I think that he never grasped that these transformations are conceived to be norms *for any physical law*, and that special relativity—if true—affects all parts of physics. Reichenbach seems simply to ignore this fact in his analysis. Certainly he had become aware of the fact that Einstein's theory has physical implications. But for him, these concerned only the mentioned measuring bodies and processes. What counted for him was only the free choice of definitions: *everybody has the right to do what he wants.*

This limitation to light rays, clocks, and measuring rods is characteristic for Reichenbach's way of thinking, and one has to admit that his axioms which use just those concepts are fascinating. In the discussion after his talk about his new axioms of relativistic space-time at the German Congress of Physics in Jena 1921 (Reichenbach 1921), someone in the audience remarked: "To these axioms the

principle of relativity has to be added." To which Reichenbach answered: "That was not the problem to be solved."[3] It seems that Reichenbach considered the principle to be epistemologically unimportant. He simply did not know that the physical invariance principles play an important role in epistemology (see Kamlah 2002, chapters 11–13).

In his *Theory of Relativity and A Priori Knowledge* (1920) Reichenbach still mentions the two principles of special and general relativity. Sometime later, they seem to have lost their significance for him. What remained was his obsession of the freedom to choose ones concepts in physics: *Everyone has the right to do what he wants*.

7.2.3 Volitional Bifurcations

Reichenbach wrote *Experience and Prediction* (1938) during his stay in Istanbul, a book in which he again and again uses the expression "volitional decision". With regard to this concept, one might ask just what else can a decision be, if not a directive for the will? Or, what would it be if it was not "volitional"?

Thus, it seems that the adjective "volitional" is a clearly superfluous, even ideological, addition. Another term which appears in this book is "volitional bifurcation". With regard to this notion Reichenbach states:

> The examples chosen from the theory of space and time previously mentioned are likewise to be ranked among conventions. There are decisions of another character which do not lead to equivalent conceptions but to divergent systems; they may be called *volitional bifurcations*. (1938, 10; *GW* vol. 4, 5)

Reichenbach introduces the concept of volitional bifurcation in a discussion of the difference between positivism and realism. He thinks that distinguishing between these two viewpoints should be understood to be a matter of deciding between different languages. In his own words:

> With the reflections of the preceding section our inquiry about the difference of the positivistic and the realistic conception of the world has taken another turn; this difference has been formulated as the difference of two languages. [...] The conception of the difference in question as a difference of language corresponds also to our idea that the question of meaning is a matter of decision and not of truth-character. (1938, 145; *GW* vol. 4, 92)

In short, he thinks that we can choose between an "egocentric" (positivist) language and a "realistic language". Positivism (including solipsism) and realism are, for Reichenbach, not two different theses with empirical content, but rather two different ways to encounter the world between which we may decide.

The former language, however, is much poorer in its expressiveness than the latter. This seems to be clear, since the solipsist has in his language no personal

[3] See Kamlah (1979), Comments to *GW* vol. 3, 466.

pronouns. The words "I, you, he, she, we, you, they" are for him devoid of meaning. He is also lacking the concepts of love and hate, responsibility and thankfulness, and many others. Thus the language of realism offers us much further reaching possibilities than that of positivism. And the decision to accept one of both languages is not one made for one of two equivalent alternatives. And even if this may be conceded, for Reichenbach this choice between the two is basically free.

There are surely many objections to be made against Reichenbach's analysis. But that is presently not our subject. We are here rather interested in studying the role of his volitionism.

7.2.4 Induction

In the winter of 1933 Reichenbach must have had the idea that our whole corpus of empirical knowledge rests upon a single decision—he calls it a "volitional bifurcation"—namely the decision to accept or to reject the rule of induction.

The principle or rule of induction says that future events of a certain kind will happen nearly as frequently as they do now that means i.e. in a sample of the events hitherto observed.

Let a sample of n events be given; m events from the sample may have the property A, the other ones $\neg A$. $h^n = m/n$ is the relative frequency of A in the sample. We than have:

> For any further prolongation of the series as far as s events ($s > n$), the relative frequency will remain within a small interval around h^n; i.e., we assume the relation
>
> $$h^n - \in \leq \; h^s \; \leq \; h^n + \in$$

where $\in$ is a small number (1938, 340; *GW* vol. 4, 213).

If we decide to accept this postulate, we may have a chance to gain knowledge in our world and to survive in it. In other words, our survival depends on the favourable result of a wager which we make against the world. We are free to make such a wager; and at the point of that "volitional bifurcation" we choose one of two possible paths. As Reichenbach argues:

> The inductive inference is the only method of which we know that it leads to the aim if the aim can be reached; this is the reason why we must use it, if we want to reach the aim. The problem of the inductive inference finds its solution by means of the argument that it is not necessary for the application of this inference to know a *positive* condition to hold, but that the application is already justified if a negative condition is *not* known to hold.
>
> We are often confronted by similar situations in daily life. We want to reach a certain aim and we know of a necessary step, which we shall have to take in order to attain this aim, but we do not know whether this step is sufficient. He who wants to reach the aim will have to take the step, even if it is uncertain whether he will reach his aim in this way. The businessman who keeps his store well stocked so that he can sell something when a costumer comes in, the unemployed who makes an application with reference to an advertisement in the paper, although he does not know whether he will receive an*swe*r,

> the ship-wrecked man who climbs a cliff, although he does not know whether a rescue-ship will spot him—all these persons find themselves in an analogous situation; they satisfy the *necessary* conditions of reaching an aim without knowing whether the *sufficient* conditions are satisfied. (1933b, 423)

With regard to these examples, I think that everybody would apply the usual procedure of induction even if he does not know if he has any chance that his expectations are justified.

7.2.5 Result of the Preceding Subsections

I want to emphasize once more that the adjectives "volitional" and "arbitrary" which Reichenbach likes so much are absolutely redundant. Certainly every decision is volitional. Otherwise it is not a decision at all. And, the same holds for the word "arbitrary". If a decision is not arbitrary in some respect, it is not a decision but a giving way under external pressure.

Therefore, the terms "volitional" and "arbitrary" do not mean anything in this context but represent what Carnap has called "accompanying ideas" (begleitende Vorstellungen) which add nothing to the factual content (sachlicher Gehalt) of statements (Carnap 1928). These terms are purely ideological and reveal Reichenbach's extreme liberalism and decisionism.

We encounter those "volitional decisions" everywhere in Reichenbach's epistemology. I have mentioned three kinds of them: coordinative definitions, bifurcations, and the wager to accept the rule of induction. He compares these volitional decisions with the choice to do science:

> What is the purpose of scientific enquiry? That is, logically speaking, a question not of truth character but a volitional decision, and the decision determined by the answer to this question belongs to the bifurcation type. If anyone tells us that he studies science for his pleasure and to fill his hours of leisure, we cannot raise the objection that this reasoning is "a false statement"—it is no statement at all but a decision, and *everybody has the right to do what he wants* (my emphasis—A. K.). (1938, 10; *GW* vol. 4, 5)

Reichenbach puts the mentioned three kinds of decisions on the same level as the choice to pursue a certain hobby. For a hobby it is certainly essential that it is a freely chosen activity. And, as long as the interests of others are not impaired, there is nothing objectionable about it. But are the aforementioned decisions really of the same kind? Or do they have to prove to be successful in a consistent description of the world?

Reichenbach was probably aware of these doubtful questions and their implications, but he seemed to forget about them from time to time. At those moments he would unequivocally proclaim the "right to do what one wants". However, this idea, in its more radical interpretations, becomes untenable within the domain of ethics. And indeed, as we will see in Sect. 7.5, Reichenbach favoured a rather mitigated version of his principle in that field.

7.3 The Influence of the *Jugend* Movement on Reichenbach

7.3.1 Introduction

The history of philosophy is often seen as a mere record of the discourse of a number of eminent philosophers that has been going on for some 2,500 years. In a way, the philosophers themselves are not altogether innocent of this rather one-sided picture, for they have a tendency to immerse themselves exclusively into the works and thoughts of other philosophers in their writings. This way, influences on philosophy coming from the outside world go largely unnoticed. This is a pity, for, surely, philosophers, like everybody else, are children of their times and, as such, subject to changes in society. Therefore, a modern historiography of philosophy must not ignore the socio-cultural environment of its protagonists. As a matter of fact, a history of philosophy that leaves out the political, economic, and scientific developments of the time—let alone the trivia of everyday life like pop culture, the media, and the movies—will give but a distorted picture of its subject.

The point here is that these unofficial sources can be very important and a modern history of philosophy should make every effort to incorporate them. I would even go so far as to say that influences coming from the society at large are more important than many a work by erstwhile philosophers, and that acknowledging them will greatly enhance progress in modern philosophy. This way, epistemology will, at last, become a true mirror, always reflecting the latest state of social and cultural development.

With this in mind, I want to have a look at some of the socio-cultural influences which have been important for the development of Reichenbach's philosophy of science. In particular, I want to focus attention upon three social movements that took place in Germany, during the early 1910s:

(i) the *Wandervogel* ("Birds of Passage");
(ii) the *Landschulheim* movement;
(iii) the *Freistudenten* ("Free Students").

In particular, his commitment for the *Freistudenten* was decisive for his philosophy throughout his whole life.

7.3.2 The Wandervogel Movement[4]

The *Wandervogel* was the first incarnation of what later became the *Jugendbewegung* (youth movement). In 1896 some grammar school students in Steglitz (nowadays a part of Berlin) set out on their first hiking tour. They wanted to escape

[4] See the memoir of Carl Landauer (*SW* vol. 1, 25–30). This text contains nearly everything which is important for section 3 of our paper. See also Blüher (1912–1914) and Laqueur (1962).

the big city and freely roam in the woods, fields, and meadows. The first two verses of one of their songs characterizes how they saw themselves[5]:

[1. verse:] From grey cities walls we roam through woods and fields.
Who stays may rot. We travel into the world.
[2. verse:] The woods are our love, the sky is our tent
Whether bright or dull. We travel into the world.

They also wanted to escape the authoritarian education from their parents and teachers. These groups soon developed certain habits at their *Fahrten* (today *fahren* means to travel by means of a vehicle, originally it meant also "to hike"). They slept in the hay in farmers' barns and even under the open sky, and they cooked their meals over open fires. They sang songs that came from various sources: some from soldiers, hiking kraftsmen, some from sailors, and some were just ordinary folk songs. There were also old songs from the sixteenth century and, of course, there were those they composed themselves.

Their instruments of choice were the lute and the guitar. Their *Fahrten* could last an entire summer vacation, and range over some hundred miles. Their attitude was one of general escape: from the constraints of an industrialized bourgeois society as well as from a repressive school system. The *Wandervogel* was certainly not an educational institution conceived by educationists as were the Boy Scouts. Rather, it was a grass roots movement that sprang up among and was run by the teenagers themselves.

Within a few years the *Wandervogel* spread out all over Germany. Due to much disagreement among its leaders, it split up into many different associations that, together, formed a mighty movement, the *Jugendbewegung*. After some years the *Wandervogel* wanted more than just to hike. They developed a new consciousness and a new culture: a *Jugendkultur*. A new life style was created. Many groups renounced smoking and drinking alcohol. Many wore new kinds of clothes, and cultivated folk dancing.

[5]The song, however, with the text by Hans Riedel and Hermann Löns was composed by Robert Götz much later in 1920. So it is not really an authentic source about the *Wandervogel*. But it reflects well what the teenagers of the *Wandervogel* felt. The original Text is:

Aus grauer Städte Mauern	Der Wald ist unsre Liebe,	Ein Heil dem deutschen Walde,	Die Sommervögel ziehen
ziehn wir durch Wald und Feld,	der Himmel unser Zelt.	zu dem wir uns gesellt.	schon über Wald und Feld.
wer bleibt, der mag versauern,	Ob heiter oder trübe,	Hell klingt's durch Berg und Halde:	Da heißt es Abschied nehmen,
wir fahren in die Welt	wir fahren in die Welt.	wir fahren in die Welt.	wir fahren in die Welt.
Halli, hallo, wir fahren,	Halli, hallo, wir fahren,	Halli, hallo, wir fahren,	Halli, hallo wir fahren,
wir fahren in die Welt.	wir fahren in die Welt.	wir fahren in die Welt.	wir fahren in die Welt.

Hans Reichenbach seems to have been part of the *Wandervogel* community, and we will see in the following subsections that this remained important for his succeeding years as university student.[6]

7.3.3 The Landschulheim Movement

The second movement which influenced Reichenbach was the *Landschulheimbewegung* (cf. Nohl 1933). In the same year, when boys from Steglitz started their first hiking tours, Hermann Lietz founded his first *Landschulheim* in Ilsenburg near the Harz Mountains. Lietz wanted to offer a broad education to young people, and not merely academic instruction, as was done in the public grammar schools (*Gymnasien*). In some way the English boarding schools were a model for his project. But the goal of his education was not to form the perfect English gentleman. Hermann Lietz felt that education had to take the entire human being into account and, not just his brain. This is why every student had to learn a craft. Furthermore, the schools founded by Lietz—and some of them still exist—are located in the countryside, for he believed that the unspoiled atmosphere of the country was more conducive to his educational objectives than a city environment.

In 1900, Gustav Wyneken, who had studied theology, became one of the teachers at the *Landschulheim* in Ilsenburg. He worked there and at anothers of Lietz' schools, for a total of 6 years. But by the end, Wyneken refused to go along with Lietz' concept of education which was based on his firm belief in the natural authority of the educator towards his pupils. Wyneken, however, had become convinced that children and teenagers are naturally curious and that they want to learn and to discover human culture their own way rather than take over the beliefs of the older generation. They want to follow rules that they, themselves, feel to be justified. They want to deal with literature, music and art that they, themselves, feel to be convincing and honest. And, they want to learn about the things that they, themselves, feel to be relevant. The role of the educator, therefore, is to encourage and support his pupils' spontaneous initiatives. He must incite rather than stifle his students' natural urge for activity. On this point, Wyneken wrote:

> The acknowledgment of the youth's right to a self-determined lifestyle and to the feeling of their valuable and irreplaceable originality is what sets the modern educator apart from the reactionary, prevailing and feigned. This attribute does not yet make up the entire pedagogical talent, but is its necessary foundation. Considered from this perspective, the educator is no longer an educator, not a "soulsmith" or "personcreator," but a leader, indeed a leader chosen by the youth itself. Only he, who naturally attracts them and whom they

[6]Carl Landauer, a former friend and a member of the inner circle of *Freistudenten*, writes in his memory of Hans Reichenbach (*SW* vol. 1, 26): "Hans, I think, had been in the *Wandervogel* while in highschool." Hans Ulrich Wipf writes: "Hans Reichenbach is considered an eminent exponent of the generation of students which was shaped by the *Wandervogel*" (Wipf 1994, 167).

> follow, can be an educator in the new sense, not however he, who has no respect for the willpower which lies in the youth's nature, who only discerns the imperfect brain-states and wishes to alleviate this shortcoming. [. . .]
>
> The method of teaching is to be understood as an agreement between teacher and students to reach a certain goal through joint effort. It does not suffice to only endorse the now generally accepted right to ask questions: what is more, he shares a responsibility for the progress and success of the tuition, in other words, it is his duty to take part in the tuition's successful development using his best endeavors. And he will be the best teacher, who evokes such participation. (Wyneken 1914, 39)

It seems that the spirit of Wyneken's theory of education was the same as that of the *Jugendbewegung* and the *Wandervogel*.

In 1906, Wyneken founded his own boarding school, the *Freie Schulgemeinde* Wickersdorf (near Meiningen in Thuringia). There he tried to put into practice his own ideas about education. The *Freie Schulgemeinde* was governed by a committee of pupils who were elected by a general assembly. The official policy of this school was that the teachers, and even Wyneken himself, could not dictate to the pupils what they had to do. But, in reality, the personality of Wyneken was strong enough to persuade the committee to follow his suggestions. And in most cases it did.

One can hardly imagine that such a model of school administration would work under an average headmaster. However, Wyneken was a charismatic leader who could inspire young people. As a result, he managed to run his school more as a consultant than as a director. In 1910, however, he got into trouble with the government of the duchy of Sachsen–Meiningen (one of the eight tiny states which were later united to form the state Thuringia). The reason for his difficulties was Wyneken's concept of religious education. For, though trained as a theologian, Wyneken later became a free thinker who considered religion to be merely a cultural phenomenon—though a very important one. Such ideas were inacceptable to the government, and he was told that he either had to leave the school or else it would be closed. Wyneken decided to leave, and during the following years he traveled around in Germany giving talks on education. In these years he became well known to the *Freistudenten* at different universities where many students in his audience were training to become school teachers. It is this context that Hans Reichenbach, who was one of the leaders of the *Freistudentische Bewegung*, made Wyneken's acquaintance and became strongly influenced by him.

Before World War I, Wyneken became the theoretician of the *Jugendbewegung* which culminated shortly before the War in the festival on the Hoher Meißner. At this time, there had already existed a powerful air of congeniality between the *Wandervogel* and Wynecken's *Freie Schulgemeinde* Wickersdorf, but soon the ties between the two movements were to become even closer. In 1913, the *Wandervoge*l, the *Freie Schulgemeinde* and many other groups of the *Jugendbewegung* met on the Hoher Meißner, about 50 km to the south of Göttingen, at a festival of German youth. The Hoher Meißner is a 700 m high mountain whose flat top provides space for large groups of people to congregate. It is situated not very far from the geographical centre of Germany, and it is known as the mythical place where "Frau

Holle" lives.[7] The story goes that that every time this mythical creature makes her feather bed, downy feathers will fall down to the earth in the form of snow.

More than 2,000 teenagers and young people gathered at the festival. Reichenbach went to the Hoher Meißner with a delegation of the *Freistudenten*, as well as Rudolf Carnap, who was there as a member of the *Sera–Kreis* from Jena, where he was studying.[8] At that time, however, the two philosophers did not know of each other.

The Meißner Festival was organized as an alternative to the celebration of the Centennial of the Battle of Leipzig of 1813, in which Napoleon and the French Army were defeated. On the occasion of the centennial celebrations a colossal memorial, the *Völkerschlachtdenkmal*, was to be inaugurated, and one could safely expect that every conservative and military group, especially the *Korporationen*, would come together in an orgy of nationalist fervour. At the Meißner Festival, many speeches abounding with idealism were made. Wyneken gave the main address. At the festival, too, the *Freideutsche Jugend* was founded as a parent organization of the many youth associations (*Bünde*), which were present at the festival, and one agreed at the so called *Meißnerformel* which stated that:

> The *Freideutsche Jugend* wants to shape its own life by self-determination, on its own responsibility and with inner truthfulness. It jointly defends this inner liberty under all circumstances. *Freideutsche Jugendtage* are held for exchange of ideas. All common meetings of the *Freideutsche Jugend* are free of alcohol and nicotine.[9]

One year later the Great War started, and most of the leaders of the *Wandervogel* movement, and of other groups which had emerged from it, were conscripted. Many of those fell in its bloody battles that followed.

7.3.4 Reichenbach's Involvement in the Movement of German "Freistudenten"

Hans Reichenbach's early involvement with the rather loosely organized *Freistudenten* ("free students") has determined the style of his philosophical thought for his entire life. The *Freistudenten* or *Finken* ("finches") were those students who were not members of the *Korporationen*.In earlier centuries almost every German student

[7] A character of Grimm's fairy tale, known in English culture as "Mother Holle," or "Mother Hulda".

[8] For Reichenbach see 1913e, for Carnap see (Dahms 2004, 70). Carnap was a member of the Sera-Kreis in Jena, which, like many other groups, supported the initiative of having a meeting of all groups of the *Jugendbewegung* at Hoher Meißner. Carnap, however, writes in his autobiography that he met Reichenbach for the first time in Erlangen in 1923; see Carnap (1963, 14).

[9] From Erich Weniger (1980): 1–8, quotation 3: "The *Meißnerfest* is the unforgettable peak [highlight; *Höhepunkt*] of the movement."

belonged to a *Korporation*. However, starting at the second half of nineteenth-century, less and less individuals had the money to pay for the sabres, uniforms and large quantities of beer which was drunk during their meetings. This trend continued, so that by the end of the century the *Finken* made up 50% of all German students. Of course, the *Finken*, like all students, did not want to spend all their time studying. So they founded an informal organization that was meant to provide sporting events, parties, evening lectures, and discussions on subjects of general interest.

The *Freistudenten*, however, did not want to become just another *Korporation*. But a minimum of organizational structure was indispensable. So, at many universities, they held general assemblies to which everybody had access and where they elected their leaders who were meant to represent them in front of the authorities and also to the *Freistudenten* at other universities.

While most members of the *Korporationen* adhered to a rather conservative ideology, one would find among the *Freistudenten* individuals of a more liberal or even socialist persuasion. To these students the rituals and antiquated forms of behaviour which were cultivated in the *Korporationen* did not make sense. They were especially repelled by their medieval concept of honour. Thus the *Freistudenten* generally came to be associated with a more modern attitude towards life and politics.

Among the leading circles of the *Freistudenten* the spirit of the *Wandervogel* prevailed, since most leaders had been members of that movement in their youth. So had Hans Reichenbach, it seems.[10] While many of the *Freistudenten* had been in or were influenced by the *Wandervogel* movement, there existed also the *akademische Freischar*, a group which tried to carry over the life and activities of the *Wandervogel* into the universities. The *akademische Freischar* shared with the *Freistudenten* their opposition against the *Korporationen*, and therefore they were a natural ally of them. But they were not *Freistudenten* themselves.

For Reichenbach, being a *Freistudent* meant more than only the absence of membership in a *Korporation*. He actually developed a kind of ideology of the *Freistudenten*, which contained many ideas of the *Wandervogel* and the *Landschulheim* movements. In an essay for a student journal he wrote:

The desired end of the Free Students can be summarized as follows:

> The supreme moral ideal is exemplified in the person who determines his own values freely and independently of others and who, as a member of society, demands this autonomy for all members and of all members. [. . .]
>
> The individual may give his life whatever form he finds to be of value and may set for himself particular goals, as, for instance, to follow the profession of an artist or a mathematician, but to demand that others pursue the very same goals is to overrate one's own particular gifts to the exclusion of others, is to be both petty and pedantic. [. . .] The individual may do whatever he considers to be right. Indeed, he ought to do it; in general, we consider as immoral nothing but an inconsistency between goal and action. To force a person to commit an act that he himself does not consider right is to compel him to

[10] See Landauer (1978), Wipf (1994), and Linse (1974).

> be immoral. That is why we reject every authoritarian morality that wants to replace the autonomy of the individual with principles of action set forth by some external authority or other. (1913, 109)

We encounter here the nucleus of the ideology of the *Jugendbewegung*, which was the urge for autonomy. And it is this urge that shaped Reichenbach's philosophical endeavour for the rest of his life. The idea of autonomy, which is most clearly spelled out here, later appears in his epistemology in the guise of conventionalism, and more directly within his conceptions of education and ethics (cf. Kamlah 1977, 480–483).

7.4 The Montessori School

After World War I, the spirit of *Jugendbewegung* continued to be influential in the pedagogical movement (*pädagogische Bewegung)* which split up into many different projects of education each with their specific theories (cf. Nohl 1933). One of these were the Montessori schools, that based education on the principle of voluntary cooperation. They were initiated by the Italian Maria Montessori.

At this time, Reichenbach was married and had two children that he sent to a Montessori school in Berlin–Dahlem. In the early 1930s he published an article, in the journal *Die neue Erziehung*, which seems to refer to the Montessori school in Berlin. In it Reichenbach describes the interplay between the principle of voluntary cooperation and group pressure that he knew from Wyneken's *Freie Schulgemeinde*. In a way, this article can be seen as a missing link between Reichenbach's early talks to the *Freistudenten* and his chapter on ethics in *The Rise of Scientific Philosophy* about 40 years later. Here are some quotes from it[11]:

> It is not at all true that children avoid work, that for them learning is inherently disagreeable. This is only the case when you lead them along enforced paths (*erzwungene Wege*), not, however, when they are allowed to learn on their own accord. (1931, 94)
>
> You see that in the Montessori-school too, of course, there is pressure (*Zwang*): But it is not the pressure of an external authority, but a pressure, which exists *within the endeavor* itself (*in der Sache*).
>
> Even the superior, the master, the department head etc. are not educators of the same kind as the teachers, because they are not concerned with the subjective achievements but instead only with the objective product of their subordinates' labor; their wishes and requests are therefore simply a component of the situational constraints (*Situationszwang*), are rated as facts, such as, for instance, the necessity to speak Spanish when establishing commercial correspondence with South America. (ibid., 96)
>
> Such situational pressure must also be imputed to the pressure within social groups, which asserts itself substantially throughout life. It is precisely this pressure though, which is so fervently at work in the Montessori-school. One is surprised how in this seemingly individualistic youth, for which classes are disbanded into free workplaces,

[11] Engl. translation of excerpts from quotations in Kamlah (1994).

> an overwhelming and coherent sense of community, can come about. [. . .] In occasional collective events, for instance in the preliminary discussion of an excursion, one can observe such a sense of community in a positive form. The child, who cannot integrate into this team spirit, is continuously drilled by the invisible social pressure until he has found his place among the others. (ibid., 97)

In other words, one simply has to let school children—and people in general—do what they like. One should not force them to cooperate with others, for they will eventually do this voluntarily—forced by their own interests as it were—and thus find their way. Behind all this one might detect, once again, Reichenbach's one and only rule of ethics: "Everybody has the right to do what he wants". But in the next section it will be shown that Reichenbach's ethical principles are a bit more sophisticated than this. Yet, his ethical non-cognitivism is already perspicuous here. And it has not changed much. For, many years later, when he dealt with ethics properly speaking in *The Rise of Scientific Philosophy* he formulated essentially the same non-cognitivism.

7.5 Ethics

According to Reichenbach (1951), there is no such thing as a science of ethics. Of course, we can, like a sociologist, study the behaviour of people and examine whether they follow general rules. But the mere description of human behaviour will not reveal the maxims and norms behind such behaviour. Neither a teacher, nor a policeman is entitled to dictate ethical rules to anyone. Everybody has to decide for himself which norms he will accept. Reichenbach compares this freedom of choice with that one has when selecting a hobby.[12]

But even there, like in all ethical decisions, the choice might not be an easy one. If I take up the hobby of, let's say, killing people, I will get into trouble with my fellow citizens. For, they have their own interests, among which is the widespread desire not to get killed. Thus, were I to take up such a hobby, I would sooner or later end up in jail. Therefore, I will have to find a way to get along with my fellow citizens.

Reichenbach firmly believes that this is what most men want anyway: to live in peace with their neighbour, and that they will think twice before selecting hobbies like murder or terrorism. Nevertheless, he stresses the fact that we are free in our decisions. Neither natural laws nor law codices like the Ten Commandments can dictate us what we must do.

This, again, sounds like a clear endorsement of the maxim that "Everybody has the right to do what he wants". However, when directing himself to a fictitious critic, Reichenbach writes:

> You see that the volitional interpretation of moral directives does not lead to the consequence that the speaker should allow everybody the right to follow his own decisions;

[12] See Section 3 on *Freistudenten*.

> that is it does not lead to anarchism. If I set up certain volitional aims and demand that they be followed by all persons, you can counter my argument only by setting up another imperative, for instance the anarchist imperative "everybody has the right to do what he wants". You cannot prove, however, that my system of volitional ethics is inconsistent, that logic compels me to allow everybody the right to do what he wants. (1951, 294; *GW* vol. 1, 409)

However, he did not go so far as to proclaim the "anarchist imperative". Rather, he held that:

> We may differ in many respects, perhaps about the question of whether the state should own the means of production, or whether a world government should be set up that controls the atomic bomb. But we can discuss such problems if we both agree about a democratic principle which I oppose to your anarchist principle:
>
> Everybody is entitled to set up his own moral imperatives and to demand that everyone follow these imperatives.
>
> This democratic principle supplies the precise formulation and of my appeal to everybody to trust his own volitions, which you regarded as contradictory to my claim that everybody may set up imperatives for other persons. (1951, 295; *GW* vol. 1, 410–11)

It is not easy to understand this "democratic principle". For, we normally understand the idea of being "entitled to demand something" as follows: If I have the right to demand *A*, this implies an obligation for other people to obey my command. They have to execute *A*. But that is not what Reichenbach means. Rather, on his account, I can only try to convince my fellow men to accept that *A* is desirable or to get them in any way to follow my order. To try to understand this strange principle better, let us compare it with Kant's categorical imperative:

> Act only according to that maxim whereby you can at the same time will that is should become a universal law.[13]

Reichenbach's principle can be rephrased, using some of Kant's terms, in the following way:

> Everybody is entitled to set up maxims and to demand that they should become universal laws and that all people act according to them.

All the examples for such maxims that Reichenbach gives are universal. For instance the following:

> The imperative that if there is more than one room to each person in a house, the surplus rooms should be opened to persons who have no room of their own. (1951, 295; *GW* vol. 1, 411)

Obviously, both, Kant and Reichenbach presuppose that moral rules or laws should be universal. The main difference between Kant's and Reichenbach's principles regards the distinction between a duty and a right. Kant demands that the individual obey those rules which he himself wants other people to follow. Whereas Reichenbach demands that the individual try to make other people obey his own

[13] Kant (1785), 17, Engl. transl. Kant 1993, 30.

rules. This distinction reminds one of the disagreement the teenagers who founded the *Wandervogel* once had with their teachers. The students wanted the notorious "thou shalt" to be replaced with "you may". Reichenbach makes it quite clear that the imperatives or maxims which different people propose can vary widely. Kant, it seems, did not realize this difficulty which can lead to different interpretations of the categorical imperative.

Let us assume that people actually succeed in obeying a codex of rules or laws, either voluntarily or under compulsion. How can we be sure that this will not result in a totalitarian society? Reichenbach seems to believe that men's nature is essentially good. His conception of human nature was a very optimistic one, in spite of the Nazi induced terrors at play in the decade before he wrote *The Rise,* and the communist rule in many countries which still existed at the time. Reichenbach's optimism that his volitional principle will work, can be illustrated by the following passage:

> Whoever wants to study ethics, therefore, should not go to the philosopher; he should go where moral issues are fought out. He should live in the community of a group, where life is made vivid by competing volitions, be it the group of a political party, or of a trade union, or of a professional organization, or of a ski club or a group formed by common study in a class room. There he will experience what it means to set his volition against that of other persons and what it means to adjust oneself to a group will. If ethics is the pursuit of volitions, it is also the conditioning of volitions through a group environment. (1951, 297; *GW* vol. 1, 412–13)

Beyond that, he seems to adhere to a kind of eudemonism, even though this is never stated very clearly:

> The exponent of individualism is short-sighted when he overlooks the volitional satisfaction which accrues from belonging to a group. Whether we regard the conditioning of volitions through the group as a useful or a dangerous process depends on whether we support or oppose the group; but we must admit that there exists such a group influence. (1951, 297; *GW* vol. 1, 413)

What Reichenbach did not see, was that to examine the rules, which best govern human society was exactly what is commonly called "ethics". Today his position seems strange to us, since discussions about morals, medical and environmental ethics are ubiquitous. Therefore we have to find an explanation for Reichenbach's puzzling conception.

7.6 The Freedom of the Will

7.6.1 Reichenbach's Discussion with Schlick and the Vienna Circle

If we remind ourselves of the importance that free choice had for Reichenbach, we should not be surprised that he was a libertarian. For somehow he was convinced that determinism contradicts the freedom of the will.

One does not necessarily have to be a libertarian if one shares Reichenbach's conventionalist attitudes in natural sciences. But this position goes well with his ethical conventionalism by which Reichenbach emphasized that the human will was free. Compatibilism, on the other hand, is very similar to determinism of the will. Many determinists have pointed out that punishment and reward are still useful instruments in human social life even if man's actions are completely determined by his past and his environment. The threat of punishment does influence the behaviour of human beings. They most likely will not commit a crime if they are afraid of its prosecution and eventual punishment.

Thus compatibilists and determinists are frequently put into the same category by libertarians. Indeed, Kant ridiculed compatibilists by calling their freedom of the will the "freedom of a roasting jack" (*Bratenwender*). The same argument was used by Reichenbach when he referred to Spinoza, who, according to him, made a distinction between internal and external causes, and called an action determined by internal causes "free".

Because of his rejection of compatibilism, Reichenbach stood in opposition to the Vienna Circle, who, like Hume, held that we are free in our actions insofar as we have made the experience that we can do what we want to do.[14]

It is true that Reichenbach had, for a while, hoped that the recently discovered indeterminism in physics might give the debate on free will a new turn. But, being a philosopher, he could not just take over the position of physicist Pascual Jordan whose arguments were rather weak anyway.[15] His friends in the Vienna Circle would have criticised him for that, especially Moritz Schlick who defended, as Hume once did, the thesis that there was no contradiction between determinism in nature and the freedom of action. Over the years, Reichenbach made several attempts to prove the freedom of action and the freedom of the will. In an interesting and deep (but partly confused) paper "The Causal Structure of the World and the Difference between Past and Future" (1925), Reichenbach claimed that he could derive the freedom of the will from the temporal asymmetry of the physical processes:

> If determinism is correct, then we cannot in any way justify undertaking an action for tomorrow but not for yesterday. No doubt it is true that it is not even possible for us to give up our *intention* to act tomorrow and our belief in freedom—we surely cannot. The point is that, given determinism, our behaviour would be senseless, for then tomorrow would be already past in the same sense that yesterday is.[16]

For the physical determinist, there cannot be a divide between past and future. That is, there is no "now". Indeed, the future is determined in the same way as the past. This thesis was met with strong opposition by Moritz Schlick, who could not accept Reichenbach's speculations. On March 20th, 1926, Schlick wrote Reichenbach that he could not follow his thoughts. Reichenbach answered:

---

[14] Hume (1748), section 8. Schlick (1930), chapter 7.

[15] Jordan (1932), Reichenbach (1935); cf. Kamlah (2008).

[16] 1925a; *SW* vol. 2, 86–87.

> With respect to the connection with determinism, I still believe that the compatibility of freedom of the will with strict causality is an untenable position. [17]

Schlick criticized Reichenbach on that point publicly. After having quoted the above passage from Reichenbach's "Kausalstruktur der Welt," he continues:

> It seems to me that exactly the contrary is the case: Our actions and resolutions (*Vorsätze*) make sense only insofar as future is determined by them.[18]

After that disagreement on time and free will, the relationship between Schlick and Reichenbach deteriorated considerably.

It is true that no kind of freedom of the will could exist, if past and future did not differ from each other. For, we act in order to give a hitherto indeterminate future some definite shape. The cognitive basis of our actions is our knowledge of the past. And the time structure of the cosmos is a necessary condition for the possibility that one can act at all—that there can be any kind of action in the world. But it is no sufficient condition for freedom of action or even for freedom of the will.

In spite of many justified objections from Schlick, Reichenbach remained convinced that there was an intimate connection between the time structure of the world and the freedom of action. For him, it was quite clear that the solution of the problem of freedom of the will could neither be as simple as physicists like Pascual Jordan believed (he tried to explain the free will by quantum mechanics), nor could determinism be true.

7.6.2 Reichenbach's Logical Reconstruction of the Freedom of Action[19]

Only in the last years of his life did Reichenbach attempt, once more, to derive the freedom of action and the freedom of the will. He wrote two manuscripts, which were merged into a single article and published posthumously by his wife Maria Reichenbach. They show how Reichenbach tried to approach the problem from the phenomenological side, listing real life situations in which we consider the will to be either free or unfree. In these two manuscripts Reichenbach tries to give a state of the art treatment of the free will problem, using a newly created formalism for conditionals.

Reichenbach distinguishes the *freedom of action* from the *freedom of the will*. The first is more easily defined, and therefore we shall reconstruct it and shall deal with the second only in passing.

---

[17] Reichenbach's letter to Schlick from 20.03.1926 [HR-016-18-12].

[18] Cf. Schlick (1931, 162).

[19] 1959a; *SW* vol. 1, 431–473.

Reichenbach uses for the formulation of freedom of action a special kind of causal conditional. Let $\diamond_L A$ and $\Box_L A$ denote the necessity and the possibility of A due to the laws of nature. Then Reichenbach's conditional $A \rightarrow B$ will be:

$$A \rightarrow B := \diamond_L A \wedge \diamond_L \neg B \wedge \Box_L (A \supset B)$$

$A \rightarrow B$ is defined in such a way that absurd cases like

If I pray to Saint Mary for improvement of my intelligence, then $2 \times 2 = 4$.

or

$$\text{If } 2 \times 2 = 5, \text{I have birthday today.}$$

will not count as valid necessary implications. In both cases we will not say that B is true because of A. B is true anyway in the first case and in the second B does not depend on A. One excludes these cases from the conditional by the inserting into the definition the clause

$$\diamond_L A \wedge \diamond_L \neg B.$$

After having defined $A \rightarrow B$, we can now write down the freedom of action. We first introduce some relations:

$V_{p,t}(B) :=$ at time t, person p wants to do B; $U_t :=$ the state of the world at time t;

$H_{t^1} :=$ the action H at time t^1

As a preliminary result we obtain for the freedom of action:

The action of doing H at time t_1 after having at time t_0 decided to do this is free

if and only if

$(U_{t^\circ} \wedge V_{p,t^\circ}(H_{t^1}) \rightarrow H_{t^1}))$ and $(U_{t^\circ} \wedge V_{p,t^\circ}(\neg H_{t^1}) \rightarrow \neg H_{t^1}))$

That means that

person p is free to do H exactly when
the volition of person p at time t° of H at time t^1 necessarily causes H at time t^1
and the same holds for $\neg H$ instead of H.

Reichenbach does not only demand for the freedom of action, that the volition of an action would imply it necessarily, but also that the will to prevent an action would imply necessarily its not taking place. This presupposes that not only the volition of H is possible, but the same also for the volition of $\neg H$, the contrary. If determinism is true, both cannot be possible at the same time. But what, then, is determinism?

Laplace has illustrated determinism via his famous thought experiment of a perfect intelligence, frequently called "Laplace's demon:"

> We ought then to regard the present state of the universe as the effect of its anterior state and as the cause of the one which is to follow. Given for one instant an intelligence which could comprehend all the forces by which nature is animated and the respective situation of the beings who compose it—an intelligence sufficiently vast to submit these data to analysis—it would embrace in the same formula the movements of the greatest bodies of the universe and those of the lightest atom; for it, nothing would be uncertain and the future, as the past, would be present to its eyes. (Laplace 1814, 4)

If Laplace's demon can predict everything that will happen and how it will happen, then we have to say that determinism is true. All events in the world are "determined" by physical laws and by the state of the world in the past. But how does Laplace's demon get the data which he needs for his prediction? Reichenbach thinks that he will not succeed because he has the laws of physics against him. Even a demon, with his overwhelming intelligence, calculation power, and nearly infinite memory is, due to the laws of physics, unable to acquire the information he needs (cf. also Reichenbach 1932).

To come to a better understanding of Reichenbach's argument, let us look at just one example: Imagine for instance the attempt to predict the trace of an outburst of matter on the surface of the sun on a photographical plate. The appearance of this trace is doubtless a physical event. But the light from the sun is not quicker than the velocity of light in general, and therefore the information about an event on the surface of the sun, which happens just now, cannot yet have arrived. The sun is about eight light minutes away. Therefore we cannot predict what will happen on the plate 8 min later. Also the Laplacian demon cannot predict what will happen on the plate before it really happens.

This was but one restriction of acquisition of data about the world. If one now defines, like Reichenbach did, determinism as the possibility for the demon, to predict all future events of physical systems from experimental data, determinism is just not true.

Also the freedom of action will now be defined in an unusual way. U_t, the state of the world at time t, is for Reichenbach to be read as

U_t:= the state of the world at time *t as far as it can be known.*

It is clear that by this interpretation of the circumstances U_t we obtain other results than the usual ones. We can call Reichenbach's concept of determinism "predictive determinism" and his concept of freedom of the action "predictive freedom of action".

We get now the following final result for the freedom of action (*SW* vol. 1, 457–460):

1. At time t^{-1} it cannot be predicted from the known circumstances U_{-t} if a person p wants at time $t^o > t^{-1}$ to do H or $\neg H$, and
2. It can be predicted that the volition of person p at time t^o of H at time $t^1 > t^o$ would cause H at time t^1 and the same holds for $\neg H$ instead of H.

Thus Reichenbach who today would have called himself a libertarian was according to the common terminology a compatibilist, for whom, even in a

deterministic universe, human actions and decisions are free in many situations. It is not our job here to go into further detail of the extended discussion on the question of whether or not the human will is free.

I want only to add here that Reichenbach already defined the freedom of will of *A* properly speaking in the same way as 20 years later did Harry Frankfurt (1971). Both philosophers define the freedom of the will as a special kind of freedom of action *H* where the action *H* is again the volition to do an action *H'*. For Reichenbach and Frankfurt as well the freedom of the will is the ability to retain an intention or resolution for a longer stretch of time (1958; *SW* vol. 1, 463–469). For this aim we have simply to replace *H* in the definition of freedom of action with a second volition V_{p,t^o} (H_{t2}). The person instead of wanting to do something wants to want to do something at a later time. This freedom can also be called strength of the will. Thus Reichenbach was ahead of the other logical empiricists of his time.

7.7 Summary

In this paper I have tried to draw a line from the *Jugendbewegung* to Reichenbach's conventionalism, his ethics and finally to his theory of free action and free will. Everybody has to find his own principles and to try to defend them. What I have reported here is only a small fraction of a connection, which was prevalent in the first half of the twentieth century. The norms which were valid in nineteenth century in art, science, and society were broken down. Men reacted differently to this fact.

There is no heaven of ideas from which principles of behaviour are obtained. Other philosophers have complained this loss of orientation. For them we are condemned to be free. Some people enjoyed the freedom which they had gained, for others chaos had been erupted. Reichenbach belonged to the first kind together with many scientists and artists. I should also h1ave studied mental developments of other logical empiricists like Carnap, Schlick and the Vienna circle, of modern artists and composers. But that would have gone beyond the limits of an article based on a talk at a philosophical workshop.

References

Hans Reichenbach's works are quoted
according to his "Collected Works" as published in German and in English:

GW. *Gesammelte Werke*, in 9 Bänden. Maria Reichenbach and Andreas Kamlah (eds.). Braunschweig/Wiesbaden: Vieweg, 1977–1999 (vol. 1–7 have been published).

SW. *Selected Writings: 1909–1953*, M. Reichenbach and R. S. Cohen (eds.). 2 vols. Dordrecht/Boston/London: Reidel. 1978.

Blüher, Hans. 1978. *Wandervogel 1–3. Geschichte einer Jugendbewegung*, 5th ed. Frankfurt: Dipa-Verlag.

Carnap, Rudolf. 1928. *Scheinprobleme in der Philosophie*. Berlin-Schlachtensee: Weltkreis-Verlag; English Trans. In 1967 *The logical structure of the world and pseudoproblems in philosophy*. La Salle Illinois: Open Court.

Carnap, Rudolf. 1963. Autobiography. In *The philosophy of Rudolf Carnap*, ed. Paul Arthur Schilpp. La Salle Illinois/London: Open Court/Cambridge University Press.

Dahms, Joachim. 2004. Die Emigration des Wiener Kreises. In *Vertriebene Vernunft,* ed. Stadler Friedrich, 66–121, vol 1, 2nd ed., Münster: Lit.

Einstein, Albert. 1905. Zur Elektrodynamik bewegter Körper. *Annalen der Physik* 17: 891–921; English Trans.

Einstein, Albert. 1920. *Relativity. The special and the general theory*. New York: H. Holt and Company.

Frankfurt, Harry. 1971. Freedom of the will and the concept of a person. *The Journal of Philosophy* 68: 5–20.

Gerner, Karin. 1997. *Hans Reichenbach, sein Leben und sein Wirken*. Osnabrück: Phöbe Autoren-press.

Hume, David. 1748. *Enquiry concerning human understanding*. London.

Jordan, Pascual. 1932. Die Quantenmechanik und die Grundlagen der Biologie und Psychologie. *Die Naturwissenschaften* 20: 815–821.

Kamlah, Andreas. 1977, 1979. Erläuterungen, Bemerkungen und Verweise. In Hans Reichenbach. *GW* vols. 1, 2.

Kamlah, Andreas. 1994. Hinweise des Nachlasses von Hans Reichenbach auf sein Menschenbild, auf Motive und Quellen seiner Philosophie. In Danneberg et al. (eds.), 183–200.

Kamlah, Andreas. 2002. *Der Griff der Sprache nach der Natur*. Paderborn: Mentis.

Kamlah, Andreas. 2008. La reception de la mécanique quantique par Reichenbach et le Cercle de Vienne. In *Mathématiques et expérience. L'empirisme logique à l'épreuve,* eds. Jacques Bouveresse and Pierre Wagner. Paris: Odile Jacob.

Kant, Immanuel. 1785. *Grundlegung zur Metaphysik der Sitten*. Riga: J.F. Hartknoch.

Landauer, Carl. 1978. Memories of Hans Reichenbach. University Student: Carl Landauer, In *SW* vol. 1: 25–31.

Laplace, Pierre Simon. 1814. *Essai philosophique sur les probabilités*. Paris; English. Trans. F. W. Truscott and F. L. Emory. *A philosophical essay on probabilities*. New York: Dover 2007 [1902].

Laqueur, Walter. 1962. *Die deutsche Jugendbewegung. Eine historische Studie*. Köln: Verlag Wissenschaft und Politik.

Linse, Hans-Ulrich. 1974. Hochschulrevolution. *Archiv für Sozialgeschichte* 14: 1–114.

Nohl, Herman. 1933. *Die Pädagogische Bewegung und ihre Theorie*. Frankfurt/M: Schulte–Bulmke.

Reichenbach, Hans. 1913. The free student idea. Its unified contents. *SW* 1: 108–123.

Reichenbach, Hans. 1920. *Relativitätstheorie und Erkenntnis apriori*. Berlin: Springer; English Trans. and ed. by Maria Reichenbach: 1965 *The theory of relativity and a priori knowledge*, Berkeley: University of California Press.

Reichenbach, Hans. 1921. Bericht über eine Axiomatik der Einsteinschen Raum-Zeit-Lehre. *Physikalische Zeitschrift* 22: 683–687.

Reichenbach, Hans. 1924. *Axiomatik der relativistischen Raum-Zeit-Lehre*. Braunschweig: Vieweg; Reprinted in *GW* vol. 3; English Trans. and ed. by Maria Reichenbach: 1969. *Axiomatization of the theory of relativity*. Berkeley: University of California Press.

Reichenbach, Hans. 1925a. Die Kausalstruktur der Welt und der Unterschied von Vergangenheit und Zukunft. *Sitzungsbericht der Bayerischen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Abteilung*. 133–175; English Trans.: The causal structure of the world and the difference between past and future. In *SW* vol. 2: 81–119.

Reichenbach, Hans. 1928. *Philosophie der Raum-Zeit-Lehre*. Berlin: de Gruyter; reprinted in *GW* vol. 2; English Trans. 1953: *The philosophy of space and time*. Trans. Maria Reichenbach and J. Freund. New York: Dover.

Reichenbach, Hans. 1931. Montessori-Erziehung. Erziehung zur Gegenwart. *Die Neue Erziehung* 8: 91–99.

Reichenbach, Hans. 1932. Die Kausalbehauptung und die Möglichkeit ihrer empirischen Nachprüfung. *Erkenntnis* 3: 32–64.

Reichenbach, Hans. 1933. Die logischen Grundlagen des Wahrscheinlichkeitsbegriffs. *Erkenntnis* 3: 401–425. *GW* vol. 5; 401–425.

Reichenbach, Hans. 1935. Metaphysik bei Jordan? *Erkenntnis* 5: 178–179.

Reichenbach, Hans. 1938. *Experience and prediction. Analysis of the foundations and the structure of knowledge*. Chicago: University of Chicago Press; German Trans. in: *GW* vol. 4.

Reichenbach, Hans. 1951. *The rise of scientific philosophy*. Berkeley: University of California Press; German Trans.: *Der Aufstieg der wissenschaftlichen Philosophie*. In: *GW* vol. 1.

Reichenbach, Hans. 1958a. The freedom of the will. In *Modern philosophy of science, selected essays* ed. Maria Reichenbach, and in: *SW* vol. 1, 431–473.

Schlick, Moritz. 1930. *Fragen der Ethik*. Wien: Springer.

Schlick, Moritz. 1931. Die Kausalität in der gegenwärtigen Physik. *Die Naturwissenschaften* 19: 145–162; Reprint in: *Gesammelte Aufsätze 1926–1936*. Hildesheim: Olms, 1969, 41–82.

Weniger, Erich. 1980. Die Jugendbewegung und ihre kulturelle Auswirkung. In *Die deutsche Jugendmusikbewegung in Dokumenten ihrer Zeit von den Anfängen bis 1933*, ed. Wilhelm Scholz et al., 1–9. Wolfenbüttel and Zürich: Möseler Verlag.

Wipf, Hans-Ulrich. 1994. 'Es war das Gefühl, dass die Universitätsbildung in irgend einem Punkte versagte...'. Hans Reichenbach als Freistudent 1910 bis 1916. In eds. Danneberg et al. 161–181.

Wyneken, Gustav. 1914. *Schule und Jugendkultur*. Jena: Diederichs.