

Gonseth and Quine

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Summary

This paper compares the four principles of Gonseth's epistemology with Quine's "Two Dogmas of Empiricism". It is shown how Gonseth's epistemology avoids the main objections to Quine's holism. On this basis, the relevance of Gonseth's epistemology for today's discussion is assessed.

Résumé

Cet article est une comparaison entre les quatre principes de l'épistémologie de Gonseth et l'article de Quine sur les deux dogmes de l'empiricisme. On montre comment Gonseth évite les objections principales contre le holisme de Quine. On considère l'importance de l'épistémologie de Gonseth pour la discussion actuelle sur cette base.

Zusammenfassung

Dieser Artikel vergleicht die vier Prinzipien von Gonseths Erkenntnistheorie mit Quines Arbeit über die beiden Dogmen des Empirizismus. Es wird gezeigt, wie Gonseths Erkenntnistheorie die wichtigsten Einwände vermeidet, die gegen Quines Holismus vorgebracht wurden. Auf dieser Basis wird die Relevanz von Gonseths Erkenntnistheorie für die aktuelle Diskussion eingeschätzt.

1. Introduction

Ferdinand Gonseth (1890–1975) puts forward claims that are similar to those which Willard Van Orman Quine (1908–2000) advances in "Two Dogmas of Empiricism" (1951). However, whereas Quine's "Two Dogmas" is perhaps the most famous philosophical paper of the second half of the 20th century, the work of Gonseth sank into oblivion. The aim of this paper is (a) to elaborate on the relation between Quine's and Gonseth's philosophical positions and thereby (b) to examine the relevance of Gonseth's work for today's epistemology and philosophy of science. I first recall the main features of Quine's "Two Dogmas", its position in Quine's philosophy and its main problems (section 2). I then introduce Gonseth's "open philosophy" (section 3) and compare its principles to Quine's confirmation holism and semantic holism as set out in "Two Dogmas" (section 4). Finally, I consider Gonseth's importance for the contemporary discussion by showing how his work avoids the main problems of Quine's holism (section 5).

2. *Quine's holism in "Two Dogmas"*

Quine's "Two Dogmas of Empiricism" (quoted according to the edition in Quine (1980), pp. 20–46) is intended to be a criticism of logical empiricism [200] and, in particular, the work of Rudolf Carnap. Quine attacks two theses that he attributes to logical empiricism:

- Statements of science divide up in analytic statements of logic and mathematics as well as definitions, which are true or false independently of the way the world is, and synthetic, empirical statements about the way the world is.
- All empirical statements can be reduced to logical constructs upon statements which describe sense experience. Each of these latter statements can be directly confirmed by sense experience.

At first, Quine argues that there is no separation between analytic and synthetic or empirical statements (pp. 20–37). Then he maintains that the programme to reduce all statements of empirical science to logical constructs upon statements of sense experience is doomed to failure. He considers the claim that experience confirms single statements to be a residue of this programme (pp. 37–41). These two theses are interconnected: if there is no separation between analytic and synthetic, empirical statements, then there are no statements which are true come what may. Experience touches upon all statements, including those that are regarded as logical laws. Quine suggests that these two theses have the same root: the supposition that the truth of each statement divides up in a linguistic and an empirical component (pp. 41–42).

Quine's alternative to these two theses – or dogmas, as he calls them – starts from the following claim: "Taken collectively, science has its double dependence upon language and experience; but this duality is not significantly traceable into the statements of science taken one by one." (p. 42) Consequently, experience cannot confirm or refute any statement taken in isolation. What is confirmed or refuted by experience – be it scientific experience, be it common sense experience – is a whole system of statements (p. 41). Quine says: "Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system." (p. 43) Consequently, no statement is immune against revision as a result of experience. Even statements that are regarded as logical laws can be abrogated in order to accommodate new experience. The demarcation between what counts as logic and what counts as empirical science can hence be subject to change.

Quine suggests regarding our system of knowledge as a – seamless – web. This web touches experience at its edges. Empirical statements such as "There are brick houses on Elm Street" are on the periphery of this web. Statements of logic are located in its centre. This web is not determined by experience: if a conflict with experience occurs, we have several options for adjusting the [201] web to experience (pp. 42–45). Quine proposes a pragmatic attitude: it is rational to opt for those changes which imply the slightest perturbation within our system of knowledge as a whole in order to accommodate this system to new experience (pp. 43–44, 46). Hence, Quine's position implies not only that experience cannot confirm or refute any statement taken in isolation, but also that there is no separation between science and philosophy in the

sense of metaphysics. Quine says: “Ontological questions, under this view, are on a par with questions of natural science.” (p. 45)

This view of knowledge is related to a position that goes back to the French scientist and philosopher of science Pierre Duhem (1861–1916). In his work on the object and the structure of the physical theory, Duhem (1914) maintains that it is not possible to put a hypothesis of physics to the test in isolation. Every experiment involves assumptions about the way in which the measuring instruments function, and these assumptions, in turn, imply physical laws. Therefore, Duhem claims that an ensemble of hypotheses or theories is put to the test in any experiment (part 2, Chapter 6, §§ 1–2). If the experimental results do not agree with our predictions, we only know that at least one of the hypotheses in question is false. But we do not know which hypothesis or which hypotheses are false. We have a number of options for changing our theory in such a way that it accords with the experimental results (part 2, Chapter 6, § 2). Duhem proposes *bon sens* as a criterion for deciding which option should be endorsed (part 2, Chapter 6, § 10).

Consequently, even the first principles of physics are subject to empirical control in the same way as all the other statements that are contained in a physical theory. If a conflict with experimental evidence occurs, it is not logically determined which statements are to be rejected. It may be reasonable to change even fundamental hypotheses of physics subsequent to the results of experiments (part 2, Chapter 6, § 9). Duhem concludes that the entire physics is one theory that is confronted as a whole with the whole of the experimental facts (part 2, Chapter 6, §§ 2, 5, 7–8).

Although Duhem’s philosophy of physics is not Quine’s background, the criticism of logical empiricism that Quine proposes is widely seen as radicalizing Duhem’s position.¹ Duhem merely refers to physics. He excludes common sense knowledge as well as sciences such as physiology on the one hand and logic and mathematics on the other hand from his thesis about confirmation [202] (part 2, Chapter 6, § 1). Quine, by contrast, generalizes this thesis in such a way that it applies to all knowledge, including common sense knowledge as well as logic and mathematics. Nonetheless, paying tribute to Duhem, this latter thesis is called the *Duhem–Quine thesis*.

The Duhem–Quine thesis is known as epistemological holism² or *confirmation holism*³. I prefer the term “confirmation holism”; this term makes clear that the target of this view is confirmation. The claim is that experience can confirm or refute only a whole system of knowledge. Consequently, whenever a conflict with experience occurs, there are several possibilities for adjusting the system of knowledge in question so that it accords with the new experience. Confirmation holism thus implies an underdetermination thesis: experience does not determine a unique system of

¹ See Quine (1986b), p. 619, and, for instance, Gochet (1977), p. 121, Vuillemin (1986), pp. 599–601, 609, as well as the distinctions which Moulines (1986), pp. 313–319, makes. For views that qualify the received opinion see Krips (1982) and Flügel (1996).

² E.g. Gochet (1977), p. 120.

³ E.g. Fodor & Lepore (1992), Chapter 2.

knowledge. There are always rival logical possibilities to account for the same experience.

Confirmation comes in degrees. The term “confirmation holism” includes both the confirmation and the refutation of a system of knowledge by experience. Let us therefore conceive confirmation as a generic property that encompasses all the possible degrees of confirmation. Degree zero of confirmation thus is complete refutation, degree one complete confirmation. In the following, I intend to understand “confirmation” in this generic sense.

Quine not only proposes confirmation holism in “Two Dogmas”, but also *semantic holism*. This is the thesis that a statement has meaning only in virtue of being part of a whole system of statements. He takes confirmation holism to lead to semantic holism. At least this is the received reading of “Two Dogmas”.⁴ The reason is that Quine adopts a verification theory of meaning from logical empiricism: the meaning of a statement consists in the method of its confirmation (p. 37). Consequently, if a statement cannot be confirmed in isolation, it does not have meaning in isolation either. If one takes a verification theory of meaning for granted and if one maintains that confirmation applies only to a whole system of statements, then one is committed to the conclusion that only a whole system of statements has meaning. Quine says in this context: “The unit of empirical significance is the whole of science.” (p. 42)

In later publications, Quine qualifies the holism of “Two Dogmas”: it is not the whole of science at once that is confronted with experience, but only a cluster of statements. Consequently, a [203] cluster of statements is sufficient for meaning.⁵ Saying that any statement can be held true come what may is right from a legalistic point of view.⁶ But, in practice, change usually occurs only within a salient cluster of statements. Nevertheless, Quine maintains that such a cluster finally encompasses the whole of science. It may be plausible to change even logical laws in order to accommodate our system of knowledge to experience. For instance, Quine claims that it can turn out to be reasonable to abrogate the law of the excluded middle consequent upon the results of experiments in quantum physics.⁷ In the last resort, it is hence only a whole system of statements – and finally the whole system of our knowledge – to which confirmation and meaning apply. Quine’s qualifications in later papers do not amount to a change of position, but to making his position more precise.

Even in “Two Dogmas”, Quine does not deny that there is a difference with respect to meaning and confirmation between statements such as “There are brick houses on Elm Street” and statements such as the law of the excluded middle. There are cases in which

⁴ See, for instance, Gochet (1977), p. 120. Fodor & Lepore (1992), Chapter 2, also build their criticism of Quine’s argument on this reading. See Brandl (1993), pp. 12–13, against this reading and the criticism of Fodor & Lepore (1992).

⁵ Quine (1975), pp. 313–315; Quine (1991), pp. 268–269. See already Quine (1960), pp. 12–13, and also the foreword to the 1980 edition of “From a Logical Point of View”, Quine (1980), p. VIII.

⁶ Quine (1975), pp. 313–315; Quine (1986a), p. 427; Quine (1991), pp. 268–269. See also the discussion between Vuillemin (1986), in particular pp. 608–609, and Quine (1986b).

⁷ “Two Dogmas of Empiricism” in Quine (1980), p. 43; Quine (1991), pp. 268–269. See also “What Price Bivalence?” in Quine (1981), essay 3.

it is reasonable to abrogate only statements such as “There are brick houses on Elm Street” consequent upon new experience. The web that Quine suggests as a model for a system of knowledge is seamless; but it has an internal structure: statements such as “There are brick houses on Elm Street” are located at its periphery, and statements such as the law of the excluded middle are located in its centre. This difference in location is possible only because of a difference with respect to meaning and confirmation.

Consequently, even if meaning and confirmation apply strictly speaking only to a system of statements as a whole, they indicate a differentiation within the whole: they indicate the way in which its parts, that is, the single statements, are related with one another as regards meaning and confirmation. That is to say: The logical interconnections among statements are not only syntactic relations, but also semantic ones. Otherwise any change within a system of statements would amount to replacing the whole system with a new one. It would not be possible to speak of the truth of single statements and thus to speak of continuing to hold certain single statements true; for saying of some statements that they are true requires a distinction with respect to meaning between them and other statements in the system.

[204] Ever since its first publication in 1951, Quine’s “Two Dogmas” has been a focus of philosophical discussion. There are a number of tensions within the paper and with the way in which it fits into Quine’s broader work. The most important problems are the following three ones:

1) *Materialism versus phenomenalism or instrumentalism*: Quine is a staunch materialist. He goes even as far as envisaging eliminativism in the philosophy of mind.⁸ In any case, eliminativism draws upon Quine’s holism. Eliminativists claim: (1) The system of knowledge is the system of science. (2) Statements in mental vocabulary do not fit into this system. (3) We should therefore give up common sense psychology (e.g. Churchland (1981)). Materialism presupposes a realistic attitude towards science. In particular, eliminative materialism is an extreme form of scientific realism. The idea is that science tells us what the world is really like and that only those entities that are admitted in science exist. But a realistic attitude towards science, on the other hand, does not imply materialism. However, as far as Quine is concerned, he is not only a materialist as regards ontology, but also a phenomenalist when it comes to the theory of knowledge. He maintains that all knowledge originates in sensory stimuli. In “Two Dogmas”, he goes as far as claiming the following:

As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience. Physical objects are conceptually imported into the situation as convenient intermediaries—not by definition in terms of experience, but simply as irreducible posits comparable, epistemologically, to the gods of Homer. For my part I do, qua lay physicist, believe in physical objects and not in Homer’s gods; and I consider it a scientific error to believe otherwise. But in point of epistemological footing the physical objects and the gods differ only in degree and not in kind. Both sorts of entities enter our conception only as cultural

⁸ In particular Quine (1960), §§ 45, 54.

posits. The myth of physical objects is epistemologically superior to most in that it has proved more efficacious than other myths as a device for working a manageable structure into the flux of experience. (p. 44)

This quotation exhibits an instrumentalist attitude towards science based on phenomenalism: science is nothing but a tool to impose order on experimental data and to predict such data. There is hence the following tension in Quine's holism: on the one hand, confirmation holism is about the way in which we can achieve the best system of knowledge that tells us what the world is like. On the other hand, confirming holism is about ordering our experimental data; no commitment to any entities beyond sensory stimuli is endorsed. The latter position implies a strict demarcation between statements of observation, which describe sensory stimuli, and theoretical statements, which posit entities beyond sensory stimuli.⁹

[205] 2) *Science as a collective enterprise versus individual reactions to sensory stimuli*: The mentioned tension between materialism, implying a realistic attitude towards science, and phenomenalism or instrumentalism has further repercussions. Quine writes at the very end of "Two Dogmas":

In repudiating such a boundary [a boundary between the analytic and the synthetic] I espouse a more thorough pragmatism. Each man is given a scientific heritage plus a continuing barrage of sensory stimulation; and the considerations which guide him in warping his scientific heritage to fit his continuing sensory promptings are, where rational, pragmatic. (p. 46)

Hence, in the closing sentence of "Two Dogmas", Quine formulates his holism in terms of each person accommodating the system of statements that she holds true to her sensory stimulations.

Whereas Quine uses in the quoted closing passage of "Two Dogmas" the vocabulary of statements to which single persons assent, the main target of his claims is science. For instance, Quine proposes that "The unit of empirical significance is the whole of science" (p. 42). Science is a collective enterprise; it concerns knowledge that is shared among a whole culture. I therefore talked in terms of *our* system of knowledge when I exposed the Duhem–Quine thesis above. For instance, the question how to cope with the results of the experiments in quantum physics is not a question of each man "warping his scientific heritage to fit his continuing sensory promptings"; it is a question of what is the most plausible option for a change to our shared knowledge in order to adapt our shared knowledge to this new experience. There is thus a tension in Quine's holism between on the one hand confirmation concerning knowledge shared among a whole culture and on the other hand confirmation concerning statements that single persons hold true.

3) *Justification of changes to a theory versus causal reactions to sensory stimuli*: There is a further problem for Quine's confirmation holism: How can experience confirm statements? In "Two Dogmas", Quine talks vaguely in terms of the tribunal of sense experience (p. 41). How shall we understand this metaphor? Quine usually

⁹ As to Quine's instrumentalism in connection with that distinction, see Heal (1989), Chapter 4.

conceives experience as a mere sensory happening, consisting in sensory stimuli. In a later essay, he says: “The tribunal, to worry another of my old metaphors, is just the firing of the receptors.”¹⁰ Experience in this sense can cause the acquisition of beliefs and thus induce changes to a system of knowledge. However, what we need for confirmation holism to be a *rational* enterprise is experience as a *reason* for changing beliefs. If experience is a mere sensual happening, it is not intelligible how it can be a reason for changing one’s beliefs and contemplating different options for changes to [206] a system of knowledge.¹¹ Experience can act as a reason for changing one’s beliefs if it is itself conceptual. But in this case, experience is not outside a system of beliefs. It is nothing with which a system of beliefs can be confronted. Instead, experience is included in the semantic holism as well as in the confirmation holism. Quine thus faces a dilemma between experience being a mere sensual happening that cannot constitute a reason for anything and experience being itself conceptual; in the latter case, experience cannot exert a constraint from outside on a system of knowledge.

The position that experience itself is conceptual is endorsed by philosophers such as Hanson and Kuhn.¹² They come to the conclusion that observation is laden with theory. They go as far as claiming that a system of beliefs cannot face any rational check from outside. Different systems of beliefs are incommensurable. From *Word and Object* (1960) on, Quine also maintains that the experience which confirms scientific statements is conceptual. It consists in observation statements. But Quine vehemently opposes the relativistic conclusions of Hanson and Kuhn.¹³ Instead, he claims that observation statements are excluded from semantic holism and confirmation holism. They have a meaning each independently of one another.¹⁴ Thus, according to Quine, in the case of observation statements, meaning is not a property whose instantiation requires a whole system of statements.

In the following, I shall examine Gonseth’s epistemology in comparison to Quine’s “Two Dogmas”. The focus will be the question whether Gonseth’s philosophy of science contains conceptual tools to overcome the three mentioned problems of Quine’s holism.

3. *Gonseth’s four principles*

A suitable way to introduce Gonseth’s philosophy of science is to describe the four principles that he published for the first time in 1948. They are set out in an elaborate way in a contribution to a discussion in *Dialectica* in 1948.¹⁵ Gonseth’s background is

¹⁰ “On the Very Idea of a Third Dogma” in Quine (1981), p. 40.

¹¹ Compare McDowell (1994), pp. 129–135.

¹² Hanson (1958), Chapters 1 and 6; Kuhn (1970), Chapters 10 and 12. See also Rorty (1980), part 1 and 2.

¹³ See, in particular, “Epistemology Naturalized” in Quine (1969), pp. 87–88; Quine (1993), p. 107.

¹⁴ Quine (1960), § 10; “Epistemology Naturalized” in Quine (1969), p. 89; Quine (1975), pp. 313–318; Quine (1986a), pp. 427–428; Quine (1993).

¹⁵ Gonseth (1948b), pp. 123–124. The first explicit formulation of these principles is in Gonseth (1948a). See furthermore in particular Gonseth (1975), pp. 168–170. As to Gonseth’s philosophy in

mathematics. The opposition between Euclidean and [207] non-Euclidean geometry is his main motivation to reject foundationalism, that is, the view that science proceeds in a deductive manner from an unassailable basis. In contrast to foundationalism, he develops a philosophy of science at whose centre is the idea to be open to a revision of any element of our system of knowledge. Therefore, he emphasizes a *principle of revisability*. This principle says that every position and every scientific statement, including statements of logic, can be revised. However, Gonseth makes clear that there is no question of a revision for its own sake. In order to start a process of revising a position, legitimate reasons have to be produced.¹⁶

Experience does not logically force upon us one particular way of revising or setting up a system of knowledge. Gonseth therefore stresses an element of rational, but free choice in any revision and any construction of a system of knowledge.¹⁷ Against this background he speaks in favour of envisaging several competing options for setting up or revising a system of knowledge and keeping these options alive.¹⁸

There is some debate in Gonseth's circle about the extension of the principle of revisability. Perelman (1949) raises the question whether certain logical principles such as the law of contradiction have to be exempt from revisability, because they are indispensable as the very principles that guide any revision of a system of knowledge (p. 187). Perelman himself replies to this question by making the point that the sense of the concepts that enter into the formulation of the principle of contradiction cannot be taken for granted once and for all. The idea, which is shared by Gonseth, thus is that changes to a system of knowledge can have repercussions on the sense of the logical laws by means of which the system in question is formulated. These laws are therefore not exempt from the possibility of revision. Gonseth concedes the same point as regards the principle of revisability itself.¹⁹ Revision thus concerns not only the truth-values that are attributed to certain statements; it can also affect their meaning.

The second principle, the *principle of technicity*, is to counterbalance the principle of revisability. This principle is to impose a limit on what counts as a legitimate reason for starting a process of revising a position. The idea is that the motivation for a change has to come from within existing technical, experimental means including the technical language of a science. This principle brings into focus the way in which technical progress – in particular in developing experimental instruments – is relevant to progress in science.²⁰

[208] A third principle, the *principle of duality*, is to complete the methodological procedure that the principle of technicity envisages. Duality means the duality of reason

general, see the book by Emery (1985); as to this philosophy of science, see the book by Bertholet (1968).

¹⁶ Gonseth (1948b), pp. 123–124.

¹⁷ See also “Réponse à M. J. Gawronski par F. Gonseth” in Gonseth (1960), pp. 72–73.

¹⁸ See in particular Gonseth (1975), p. 14.

¹⁹ See in particular Gonseth (1975), p. 14.

²⁰ Gonseth (1948b), p. 124. See also the four principles of scientific method in Gonseth (1970), p. 421 (reprinted in Gonseth (1994), p. 44), and in Gonseth (1990), pp. 207–215.

and experience. The aim of this principle is to bring together reason and experience. Experience means statements about single facts, whereas reason is concerned with general truths.²¹ Thus, experience is also conceptual. Instead of a deduction from a firm foundation, Gonseth's idea of science hence is that there is an interplay between general statements up to logical laws and particular statements down to statements that describe single facts or events. Changes in the periphery of the particular can have repercussions up to the centre of the general.²²

Finally, Gonseth formulates a principle of holism, namely a *principle of integrality* (or *solidarity*). This principle states that our knowledge forms a whole that does not have autonomous parts. Gonseth compares science to an organism whose parts show solidarity to one another. The principle of integrality also formulates a task rather than being a static principle: the aim is to achieve an integration of our knowledge as a whole by coordinating it with experience.²³ In short, the aim is to reach a coherent system of knowledge that relates to the world by including experience. Gonseth (1948c) speaks of a progressive revelation of reality (p. 418).

However, for Gonseth, there is no question of a linear progress. On the contrary, revisability can lead to quite profound revolutions. Gonseth (1947) formulates a view that is in that respect similar to the one that Kuhn set out later: there are both periods of linear progress and periods of revolution in science (p. 119). But Gonseth later never read Kuhn.²⁴

These four principles are the core of what Gonseth calls “open philosophy” or dialectical philosophy. “Open philosophy” refers to the point of revisability and the contact with science: in distinction to armchair metaphysics, a philosophy is intended that is continuous with science and that is prepared to change even its first principles in response to new developments in science. Gonseth also speaks of *idonéisme*, meaning that these four principles are appropriate to ensure that philosophy is in touch with experience. The dialectic intended is double: it is the dialogue between reason and experience as described by the principle of duality. It is furthermore the dialogue between the following two factors: on the one hand the freedom of choice in developing a system of knowledge – there is no logical or causal necessity to set up one specific system – and on the other hand the responsibility towards taking [209] into account all the experience available and all the rational guidelines that are at our disposal.²⁵ This latter tension is described in the interplay between the principle of revisability and the principle of technicity.

In an essay discussing Gonseth's philosophy, Perelman (1949) distinguishes between first philosophies, that is, traditional metaphysics, and what he calls “regressive philosophy”. Whereas first philosophies start from principles that are taken to be self-

21 Gonseth (1948b), p. 124.

22 See in particular Gonseth (1975), pp. 8–12.

23 Gonseth (1948b), p. 124. See also Gonseth (1948c), p. 415, and Perelman (1949), pp. 182–183.

24 See “Second entretien de Zdenek Kourím avec Ferdinand Gonseth” in Gonseth (1994), p. 258.

25 Compare “L'idée de dialectique, Dialectica et les entretiens de Zurich” in Gonseth (1994), pp. 125–162, in particular pp. 127–128. See also Lauener (1985).

evident and thus immune to revision, regressive philosophy considers its principles as being open to challenge from science (in particular p. 178). Besso (1948) suggests in a letter to Gonseth to call his epistemology “experimental metaphysics”.²⁶ This term is more apt than “regressive philosophy”: it brings to the point the four principles by emphasizing that statements of metaphysics are also subject to revision consequent upon experience.

4. *Gonseth’s and Quine’s holism*

The systematic connection between Gonseth’s four principles, formulated explicitly for the first time in 1948, and Quine’s “Two Dogmas of Empiricism”, first published in 1951, is obvious.²⁷ Gonseth’s principle of integrality expresses the same view of the relationship between science and philosophy as Quine’s metaphor of the seamless web: there is no separation between science and philosophy.²⁸ All our knowledge, from empirical knowledge up to philosophical and logical principles, is one holistic system. Both Quine and Gonseth come to this position on the basis of confirmation holism: a system of knowledge that is to describe our world – in distinction to a system that is merely logically possible – has to be conceived in such a way that experience can have repercussions on all its parts. Both Quine and Gonseth proceed from confirmation holism to semantic holism. Like confirmation, meaning propagates from the experimental periphery to the centre of our system of knowledge: changes to the system consequent upon experience do not only affect the truth-values of statements, but also the meaning of concepts. There is thus no separation between statements of fact and statements of meaning. For instance, as a result of [210] experience in the domain of quantum physics, the meaning of the concept “electron” has changed; by way of consequence, the meaning of all the statements in which the concept “electron” is employed has changed as well.

However, Quine and Gonseth differ in the way in which they elaborate on confirmation holism and semantic holism. According to Quine, the property of confirmation – in the generic sense introduced in section 2 above – applies in the first place to a system of knowledge as a whole. The same goes for meaning. Nonetheless, as explained in section 2 above, meaning and confirmation as properties of the whole system indicate an internal structure: they indicate the way in which the parts – clusters of statements down to single statements – are related with respect to meaning and confirmation. However, these parts do not have a meaning and a degree of confirmation each. Quine thus defends a *top-down conception of holism*: he begins with properties of the whole. These properties are then taken to specify a differentiation within the whole by including relations among its parts.

²⁶ Compare also Gonseth, “Science et philosophie” in Gonseth (1960), pp. 7–19.

²⁷ See also Gochet (1977), p. 121, and Gochet (1978), p. 25. Compare furthermore Emery-Hellwig (1994), pp. 148–150.

²⁸ See in particular “Science et philosophie” in Gonseth (1960), pp. 7–19, and Gonseth (1949), pp. 328–329 (reprinted in Gonseth (1990), pp. 79–80) as well as the exchange between Grassi & Gonseth (1948).

Gonseth, by contrast, can be taken to start from the parts of our system of knowledge, that is, theories in specific areas of scientific investigation and the statements of which these theories consist. Recall that the principle of revisability is counterbalanced by a principle of technicity that stresses specific areas of knowledge as starting-point. Gonseth does not object to attributing the properties of confirmation and meaning to parts of knowledge down to single statements. His point is that the degree of confirmation and the meaning of a single statement do not count among the intrinsic properties of that statement. They are extrinsic or relational properties. However, it is not sufficient to take the relation between a statement and the fact or event in the world to which the statement purports to refer into account. Gonseth's point is this one: The way in which single statements have the properties of confirmation and meaning depends on their relations to other statements and thus on their position in a whole theory and – finally – their position in our system of knowledge as a whole. Confirmation and meaning hence propagate from single statements to a system of knowledge as a whole. If the whole has the properties of meaning and confirmation, too, it has them because its parts have them. This is a *bottom-up conception of holism*: we begin with parts of the whole and properties that are characteristic of these parts (meaning and confirmation in the case of statements that are parts of a system of knowledge). We come to the conclusion that the way in which the parts have these properties depends on their relations within the whole.

To illustrate the difference between these two manners of conceptualizing holism, consider the characterizations of holism that Fodor and Lepore (1992) [211] set out in their book on holism, which is the most forceful criticism of semantic holism in today's philosophy. In the preface to their book, Fodor and Lepore take up the vein of Quine's formulation of holism. They characterize semantic holism as "the doctrine that only whole languages or whole theories or whole belief systems *really* have meanings, so that the meanings of smaller units ... are merely derivative" (p. X). In the first chapter of their book, however, they characterize holism in terms of holistic properties: "Holistic properties are properties such that, if anything has them, then *lots* of other things must have them too." (p. 2) The former characterization brings to the point what I have described as a top-down conception of holism. The latter characterization can be related to the holism that I have attributed to Gonseth: confirmation and meaning are holistic properties of statements in this latter sense, because the meaning and the confirmation of any statement depend on the meaning and the confirmation of the other statements in a system of knowledge.²⁹ I submit that this latter conception of confirmation holism and meaning holism, which can be formulated on the basis of Gonseth's texts, is more appropriate. If we do not have to refrain from attributing meaning and confirmation to single statements, holism loses the air of a paradoxical position and is closely related to scientific practice.

²⁹ On the difference between these two accounts of holism, see also Heal (1994), in particular pp. 326–328. Compare already Heal (1989), pp. 86–87, as well as the discussion between Cohen (1999a) and Cohen (1999b) and Heal (1999). See furthermore Dummett (1974), pp. 358–359; Brandl (1993), pp. 3–4. I elaborate on this distinction in Esfeld (1999), Chapter 1.4.

If we reconstruct Gonseth's position on the basis of his holism, that is, the principle of integrality, the interconnection between the four principles that Gonseth (1948b), p. 123, claims is evident. The other principles then fit in (instead of being simply juxtaposed, as Gochet objects)³⁰. If we start from integrality in the sense of a semantic holism that encompasses all our knowledge, it is obvious that local changes to our system of knowledge have repercussions that go beyond the statement or the theory in question. Local changes then may not only induce a revision of the truth-value of certain statements in other parts of the system of knowledge; they may also lead to a change in the meaning of statements in other parts.

Against this background, the concern of Gonseth (1948b), pp. 121–125, that the principle of revisability may prevent any stability in our system of knowledge is intelligible. If as a consequence of integrality, revisability can [212] go as far as implying changes to the meaning of concepts and statements in other areas of knowledge, it is obvious that a further principle is needed to counterbalance revisability. The principle of technicity limits the situations in which changes are legitimate. It introduces some sort of conservatism. It thereby is a factor of stability. In short, technicity moderates the far-reaching holism that integrality and revisability introduce in the way sketched above by confronting Gonseth's conception of holism with Quine's conception.

Finally, since integrality expresses a rationalism whose main concern is the internal coherence of our system of knowledge, a principle is needed that relates the system of knowledge to the world: Coherence is not an end in itself. We aim at a system of knowledge that integrates an empirical input from the world in a rational – and thus coherent – way. The principle of duality accomplishes that task.

Over and above supporting a version of confirmation holism and semantic holism each, Gonseth and Quine meet in their criticism of the logical positivism of the twenties. Gonseth, like Quine, rejects the positivist idea of observation statements as a foundation of science. His main objection is the holistic one that observation statements cannot be separated from the rest of our knowledge.³¹ Since observation statements employ concepts, semantic holism extends to them, and considerations of overall coherence can make it rational to revise some observation statements.

Gonseth also criticizes Popper's view of falsification as presupposing a naive realism.³² The point is: as single statements cannot be verified in isolation, so they cannot be falsified in isolation. What is confirmed or refuted by experience always is a whole cluster of statements. Like Quine, Gonseth does not endorse the relativism of

³⁰ Gochet (1977), p. 121, and Gochet (1978). Perelman (1949), pp. 182–185, also sets out Gonseth's philosophy by starting with the principle of integrality. According to him, integrality and duality are the basic principles; revisability and technicity (or responsibility, as he calls that principle) can be derived from them.

³¹ "Science et philosophie" in Gonseth (1960), pp. 13–15; "Réponse à M. J. Gawronski par F. Gonseth" in Gonseth (1960), pp. 69–71; "L'idée de la science et mon différend avec le cercle de Vienne" in Gonseth (1994), pp. 63–124, in particular pp. 69–70.

³² "Second entretien de Zdenek Kourim avec Ferdinand Gonseth" in Gonseth (1994), pp. 251–277, in particular pp. 253–256.

Hanson, Kuhn, Feyerabend and others. But he does not resort to excluding observation statements from semantic holism. In that respect, Gonseth is closer to Sellars than to Quine. In his seminal paper on “Empiricism and the Philosophy of Mind”, Wilfrid Sellars (1956) rejects what he calls the Myth of the Given, namely the idea that there is a basis for our knowledge that is not touched by the semantic holism which is characteristic of propositional knowledge.³³ Sellars, like Gonseth, puts forward the idea that our knowledge as a whole is one coherent system that relates to the world by including observation statements. These are [213] non-inferentially acquired, but not immune to revision. The following famous programmatic statement of Sellars agrees with Gonseth’s position:

For empirical knowledge, like its sophisticated extension, science, is rational, not because it has a *foundation* but because it is a self-correcting enterprise which can put *any* claim in jeopardy, though not *all* at once.³⁴

The slogan “experimental metaphysics” can sum up Gonseth’s holism in an appropriate manner. The point is that experience enters our system of knowledge in such a way that it can have repercussions which lead to a change in the meaning and the truth-value even of statements that are regarded as metaphysical. The slogan “experimental metaphysics” is used in today’s debate about the interpretation of quantum physics (without, however, its origin in the letter of Besso (1948) to Gonseth being acknowledged). The American philosopher of science Abner Shimony uses this term in order to describe the following situation: experiments in quantum physics call for a revision of metaphysical assumptions about nature such as separability and locality as well as possibly logical laws such as distributivity and the law of the excluded middle.³⁵ This example fits not only into Gonseth’s principle of revisability, but also into his principle of technicity: well-established experimental results in one particular area of physics lead to a discussion that has repercussions reaching as far as logic and metaphysics. Thus, not only is Gonseth’s principle of integrality relevant to today’s philosophy in the form of semantic holism, but his other principles, which can be reconstructed on the basis of integrality, are also applicable to today’s philosophy of science.

5. *The relevance of Gonseth’s epistemology for today’s philosophy*

Let us now come back to the three problems for Quine’s holism as set out in “Two Dogmas” that I listed at the end of the second section. Gonseth takes a clear position that is not subject to the ambiguities of Quine’s holism. Gonseth stresses rationality from the beginning: the point of his philosophy of science is not a causal or a

³³ As to the systematic connection between Quine’s “Two Dogmas” and Sellars’s “Empiricism and the Philosophy of Mind”, see Rorty (1980), Chapter 4.

³⁴ “Empiricism and the Philosophy of Mind”, § 38, quoted from Sellars (1963), p. 170. Compare Lauener (1985), pp. 8–9, on Gonseth against foundationalism.

³⁵ For instance, Shimony (1989), p. 27. See also Jarrett (1989). Compare furthermore the title of Redhead (1995): “From Physics to Metaphysics”. Lecture 3 in that book is entitled “Experimental Metaphysics”. That title is intended to be an allusion to Shimony’s claim. See furthermore the conclusion on p. 87.

psychological account of how people react to new experience in adjusting their beliefs, but a suggestion for a rational, normative procedure of how we should proceed. Introducing technicity as a principle that is complementary to revisability makes only sense against such a rational, [214] normative background. Furthermore, Gonseth makes clear that he is concerned with science as a collective enterprise. Again, he does not intend a psychological theory about the system of beliefs of single persons. The system of knowledge to which his principle of integrality applies is the system of the knowledge that is shared in our culture. Consequently, his position avoids the standard objection to semantic holism: Since the focus is not the system of beliefs of single persons and individual experience, the problem how several people can share the same knowledge does not arise. Last but not least, the experience that is relevant to the system of knowledge is conceptual according to Gonseth. It consists in observation statements. These statements are part and parcel of our system of knowledge; they do not fall outside the holism that characterizes this system. They exercise a check on knowledge in the sense of general statements from within the system. As mentioned when relating Gonseth to Sellars in the last section, the aim is coherence of our system of knowledge as a whole that relates to the world by including observation statements. What Gonseth lacks, however, is a theory of experience as a conceptual affair. Nonetheless, the three main problems of Quine's holism as set out in "Two Dogmas" do not touch Gonseth's position.

The mentioned problems do not arise in the context of Gonseth's philosophy, because Gonseth is not a materialist like Quine. He is not committed to the programme of naturalizing epistemology.³⁶ Consequently, in contrast to Quine, Gonseth does not adopt the method of the natural sciences as a paradigm for knowledge. He maintains that (a) both natural and human sciences contribute to a common research project and that (b) his four principles apply to both the natural and the human sciences.³⁷ The principles of confirmation holism and semantic holism are indeed neutral as regards the question of naturalism. To get to naturalism on the basis of these principles, their application has to be limited to the knowledge that is acquired by the methods of the natural sciences.

As regards mathematics, Gonseth is not a formalist like Quine.³⁸ He is closer to constructivism – and thus to intuitionism – than to formalism.³⁹ Nevertheless, he meets Quine's holism in regarding logic as physics of any object in general. Logic hence is a very general physics.⁴⁰ Consequently, Gonseth [215] agrees with Quine as far as the position of logic and mathematics in our system of knowledge is concerned without subscribing to formalism.

³⁶ See in particular "Epistemology Naturalized" in Quine (1969), Chapter 3.

³⁷ Gonseth (1975), p. 46 and Chapter 4, in particular pp. 170–175.

³⁸ See in particular "On what there is" in Quine (1980), pp. 14–15.

³⁹ See Heinzmann (1982a) and Heinzmann (1982b). As to Gonseth's philosophy of mathematics in general, see the papers in Panza & Pont (1992).

⁴⁰ See Gonseth (1936), Chapter 8, and Gonseth (1937), Chapter 8 (reprinted in Gonseth (1998)).

In distinction to Quine, Gonseth is not committed to a thesis of underdetermination in any sense that threatens the rationality of science. The confirmation holism that can be attributed to Gonseth does not imply any such underdetermination. Consider the main argument for confirmation holism that can be based on Gonseth's principle of revisability: If a conflict between a system of knowledge and experience in the form of observation statements occurs, the logical relations among the statements that constitute the system always open up a number of options to integrate the new observation statements. For any one statement of which it is claimed that it is refuted by experience, there is the logical possibility to retain this statement and to change other statements in such a way that the conflict with experience is removed. If there is no separation between empirical statements and statements that fall within logic, mathematics and metaphysics, the logical relations among the constituents of a system of statements propagate confirmation – in the sense of the generic property explained in section 2 – to the system as a whole.

However, why should one maintain that there is no separation between empirical statements and statements that fall within logic, mathematics and metaphysics? The case of quantum physics is a weighty argument for Gonseth's claim that the application of the principle of revisability cannot be limited to specific areas of knowledge: One can question whether it is reasonable to abrogate statements that are regarded as logical laws – such as the law of the excluded middle – consequent upon experimental evidence in quantum physics. But the point is: claiming that the law of the excluded middle is a logical truth is no argument that counters a suggestion to that effect. As soon as there is a concrete suggestion for a change to logical laws which contributes to adjusting a system of knowledge to new experience, one has to evaluate this suggestion in the light of its consequences for the system as a whole in comparison to other suggestions. However, as soon as one agrees to such an evaluation, one concedes that it is in principle possible to change statements that are regarded as logical laws subsequent to new experience. That is to say: as soon as one agrees to such an evaluation, one concedes that it is in principle possible to draw the line between logical laws and empirical statements differently consequent upon new experience. Therefore, the mere availability of such a concrete suggestion supports the claim that there is no separation between logical and empirical statements.

It is hence not mandatory to regard confirmation holism as making the trivial claim that it is always logically possible to invent an *ad hoc* hypothesis by [216] means of which one can retain any one statement or change any one statement so that the system as a whole agrees with experience. In a famous exchange, Quine (1976) concedes to Grünbaum that the point of confirmation holism is such a trivial claim. However, if we put confirmation holism in the framework of Gonseth's rationalism, its main thesis can be construed as follows: for any one statement including any one logical law, circumstances may turn up in which it is *reasonable* to abrogate the statement in question in order to integrate new experience into a system of knowledge. Nonetheless, any change to a system of knowledge is only intelligible against the background of a vast amount of statements that remain unchanged. For any one logical law, abrogating

this one law will not deprive a system of knowledge of meaning and intelligibility, because a number of other statements will remain unchanged and continue to count as logical laws. Thus, if one endorses confirmation holism within the framework of Gonseth's four principles, one is in the case of new experience only committed to admitting local changes to a system of knowledge against a background of a vast amount of statements that remain unchanged. The point of Gonseth's confirmation holism is that there are no statements for which it is *rational* to claim that they are immune to revision in the light of new experience.

The outlined argument for confirmation holism implies that the empirical evidence does not determine a system of beliefs. As Gonseth stresses, there always is an element of free choice. But this choice is not arbitrary. As Gonseth emphasizes as well, the choice should be a responsible one. Therefore, this underdetermination does not exclude (a) that there are rational criteria for a choice among different options and (b) that these criteria may distinguish one option.

Gonseth is neither a metaphysical realist nor an instrumentalist. He can with reason be characterized as a pragmatist, as Lauener suggests.⁴¹ It may be more appropriate to speak of a *pragmatic realism*. For Gonseth neither questions the existence of a world that is independent of our beliefs, nor does he object to the assumption that science aims at gaining access to that world. Gonseth is a realist in the sense of these two minimal claims. His point is to enquire into the way in which it is possible for us to have epistemic access to the world. Gonseth then meets what is known as wide pragmatism in today's Anglo-American philosophy (e.g. Putnam (1994), Brandom (1994), McDowell (1994)). For (a) he links our epistemic access to the world to our practices (recall the principle of technicity), and (b) he adopts a pragmatic attitude to our knowledge as a whole (as expressed by the principle of revisability).

[217] Confirmation holism and semantic holism have received widespread attention and acceptance subsequent to Quine's "Two Dogmas of Empiricism". The claim of this paper is that Gonseth's epistemology provides a more appropriate starting-point for discussing these positions in today's philosophy than Quine's epistemology. Gonseth refuses a commitment to materialism and a naturalized epistemology. He shifts the focus to rationality and normativity. He thus avoids the main problems of Quine's holism and meets the main concerns of today's discussion. Furthermore, his moderate conception of holism – as expressed by revisability counterbalanced by technicity – circumvents the paradoxical air of holism and is closer to scientific practice than Quine's view.

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⁴¹ Lauener (1977), p. 117, Lauener (1985), and Lauener (1990).

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