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Abstract. Poincaré's conventionalism was not quite univocal as far as the matter concerns of its relation to empiricism: it was fully empiristic on the genetic level, but only partially on the methodological level. It was so, because Poincare, who considered knowledge as having its beginning in experience, admitted, at least in some fields of science, synthetic *a priori* propositions as perfectly legitimate. This paper examines Ajdukiewicz's radicalization of Poincaré's conventionalism as an attempt of a more consequent empiricism. In particular, it is pointed out that Ajdukiewicz's treatment of the language of science as a closed and connected system was the crucial step in his way toward empiricism. Moreover, it is observed that Ajdukiewicz's radical conventionalism is a good example of an interplay of ideas coming from France and Austria.

Conventionalism is usually interpreted as a philosophy of natural sciences, as an attempt to exhibit the nature or essence of the mutual interplay between experience and theory in scientific knowledge. In fact, mathematics and physics was the main inspiration for the fathers of French conventionalism: Poincaré, Duhem and LeRoy. However, when Poincaré considered philosophy of geometry, he also touched a more general epistemological question, mainly the controversy between empiricism and apriorism. He criticized both solutions: apriorism because it is incoherent with non-Euclidean geometries, and empiricism because it is inconsistent with the very nature of geometry as a mathematical theory. Conventionalism was just a way out from both philosophical horns: space is an amorphic continuum, we impose metrics on it by conventions, so geometry is independent of experience and yet not aprioristic. Poincaré extended this idea to physics regarding its principles as definitions in disguise. One thing must be noted here. That geometry or theoretical physics are independent of experience, does not mean that they are not motivated by empirical data. Poincaré's idea was that those data do not force the unique system of geometry or physics. Thus, Poincaré (and other French conventionalists) accepted that the sources of our knowledge were empirical. We can say that an important distinction between genetic empiricism and methodological or epistemological empiricism is implicit in conventionalism. However, Poincaré's solution of the issue between empiricism and apriorism is partial, because arithmetic is an exception. For Poincaré, mathematical induction is synthetic *a priori* and this vindicates apriorism in the domain of arithmetic. The adjective 'partial' in my qualification of Poincaré's solution to the empiricism/apriorism debate is not intended as pejorative. By no means, it can be excluded that local empiricism and local apriorism are good solutions. Poincaré's methodological empiricism is local because it concerns geometry and physics. His apriorism is also local because it concerns arithmetic and every mathematical field which essentially uses mathematical induction. The problem with Poincaré is not that his epistemology was twofold:

empiristic on one side and aprioristic on the other. The trouble is that he is not quite univocal when he speaks about the genetic aspect of knowledge. Poincaré offers a quite advanced psychological explanation of the genesis of space. This explanation was even very seriously investigated by psychologists, for example Piaget. However, when Poincaré speaks on the genesis of mathematical induction, he uses very general locutions as

> This rule, inaccessible to analytical proof and to experiment, is the exact of the *a priori* synthetic intuition. On the other hand, we cannot see in it a convention as in the case of the postulates of geometry [...] Why then is this view imposed upon us with such an irresitible weight of evidence? It is because it is only the affirmation of the power of the mind which knows it can conceive of the indefinite repetition of the same act, when the act is once possible. The mind has a direct intuition of this power, and experiment can only be for it an opportunity of using it and thereby of becoming conscious of it [...] Mathematical induction — i.e. the proof by recurrence — is, on the contrary, necessarily imposed on us, because it is only the affirmation of a property of the mind itself. [Poincaré 1903, 17]

One can note that this fragment has a fairly Kantian flavour. This observation shows only a historical connection, but it does not hint us to see how Poincaré solves the genetic problem of mathematical induction. What does it mean that mathematical induction is "the affirmation of a property of the mind itself"? Is this property an idea innata? In fact, Poincaré's explanation is nothing more than a metaphor. By the way, the rise of non-standard arithmetic can provide a way for extending Poincaré's philosophy of geometry. We could treat the set of natural numbers as an amorphic class without any ordering, and say that we impose on it a principle of induction, because there are differences between standard and non-standard orderings. A follower of Poincaré could argue that standard arithmetic is the simplest and most convenient, but his opponent could point out that also non-standard systems have applications, for example in non-standard analysis. However, I will not further continue this way of completing Poincaré's conventionalism. Instead, I will try to show what follows for the empiricism/apriorism debate from radical conventionalism developed by Kazimierz Ajdukiewicz in the thirties. Ajdukiewicz's ideas are very instructive for this conference. He is a good example of cooperation of ideas arising in France and Austria at the turn of centuries. Ajdukiewicz's conventionalism was a conscious continuation of Frenchmen. In particular, Ajdukiewicz decided to go to French inspirations, because he wanted to counteract against German influences in Polish philosophy [see Giedymin 1982, XV]. In this respect, he follows Twardowski's program of the development

of philosophy in Poland: this philosophy should avoid a dominance on the side of English, French or German philosophy. On the other hand, Ajdukiewicz's conventionalism was superstructured on semiotic considerations. It was a novelty in the conventionalist traditions. Remarks on language which we can find in Poincaré, Duhem or LeRoy are quite incidental. The semiotic aspect in Ajdukiewicz's thought was certainly connected with the Brentanist tradition introduced to Poland by Twardowski himself and later considerably developed by the Lvov-Warsaw School of which Ajdukiewicz was one of the most distinguished members. Thus, very roughly speaking, Ajdukiewicz's conventionalism was a result of crossing French and Austrian influences. Ajdukiewicz was probably one of the first philosophers who fully realized the importance of the distinction between genetic (psychological) and epistemological (methodological) aspect of sources of knowledge.

> The problem of genetic rationalism and empiricism as dealing with origin of our ideas and beliefs [...] is a problem of a distinctly psychological character. It is concerned in actual fact with the way in which thoughts come to be in the human mind. With this psychological problem there has been connected, and sometimes confused, another problem, not psychological, but methodological or epistemological in character. This is the problem of how we can arrive at fully justified knowledge of reality, that is by what methods we can arrive at knowledge which is true. [Ajdukiewicz 1950, 24].

Ajdukiewicz, following this account, introduced a distinction between genetic rationalism (nativism) and genetic empiricism on the one hand, and methodological rationalism (apriorism) and methodological empiricism (aposteriorism) on the other. Briefly speaking, genetic empiricism says that our knowledge originated with experience viewed either purely sensualistically (Berkeley, for example) or in the style of Locke, that is, with admission of introspection. On nativism, the acquisition of knowledge is essentially dependent on the internal and inborn structure of the mind. The characterization of apriorism and aposteriorism is more complicated because we should distuinguish their radical and moderate version. For radical apriorism, the only knowledge is that generated by reason. This was Plato's conception of *episteme*. Moderate apriorism stresses the role of reason, but admits experience to some extent (in idiographic cases, using the terminology of the Badenian Neo-Kantianism). Radical aposteriorism (Mill) sees experience as the sole source of the legitimate knowledge. Finally, moderate empiricism (Hume, the Vienna Circle) makes a concession for *a priori* in logic and mathematics. This characterization can be sharpened by using the analytic/synthetic distinction for identification of the genuine knowledge by particular standpoints

[see Ajdukiewicz 1947]. Thus, radical apriorism admits synthetic *a priori* and analytic (= all epistemologically legitimate sentences are *a priori*); moderate apriorism admits synthetic *a priori*, analytic and synthetic *a posteriori*; radical aposteriorism admits only synthetic *a posteriori* (= all epistemologically sentences are *a posteriori*); moderate aposteriorism admits synthetic *a priori* and analytic. This scheme is very useful. Plato's concepts of *episteme*, its two kinds and *doxa* is nicely reproduced by saying that *noesis* (intuitive *episteme*) is synthetic *a priori*, *dianoia* (discursive *episteme*) is analytic, and *doxa* synthetic *a posteriori*. Kant's epistemology is captured by pointing out that: mathematics and theoretical science are synthetic *a priori*, logic is analytic, but descriptive science is synthetic *a posteriori*. Mill's radical aposteriorism simply claims that every knowledge is synthetic *a posteriori*. Finally, moderate aposteriorism sees mathematics and logic as analytic, the rest as synthetic *a posteriori*. However, there are philosophers who reject the distinction between analytic and synthetic sentences. They defend empiricism (genetic and aposteriorism) and can agree that the above characterization of apriorism is historically correct, because apriorists appealled to the analytic/synthetic distinction or something which could be intepreted as its substitute. What is new here is the interpretation of aposteriorism. This novelty is connected with the amount to which statements are determined by experience. Thus, under the general proviso that there are not purely *a priori* sentences, radical aposteriorism claims that every sentence is completely determined by experience. but for moderate aposteriorism [see Siemianowski 1993] either (a) not every sentence is completely determined by experience, or (b) no sentence is completely determined by experience. Probably we can say that statements "every sentence is *a posteriori*" and "every sentence is completely determined by experience" are equivalent. Then, there is no difference between both interpretations of radical aposteriorism. Matters are different with respect to moderate aposteriorism. At first, we see that (a) and (b) are not equivalent; (b) is stronger and implies (a). Now we can identify the difficulties of particular views, omitting radical apriorism which is only of historical interest. Of course, we should expect correlations between empiricism and rationalism on genetic and epistemological levels. Thus, apriorism should be correlated with nativism, and aposteriorism with genetic empiricism. If we assume that analytic sentences have some peculiar features (certainty, universality, etc.) which are normally ascribed to them, the problem for aposteriorism (on interpretation based on the analytic/synthetic distinction) is this: how can experience generate analytic knowledge? If we agree that it cannot, radical aposteriorism fails at all, and moderate aposteriorism explains at best the status of those domains of knowledge which consist of analytic sentences, that

is formal sciences (on this interpretation). On the other hand, moderate apriorism successfully explains the genesis of logic and mathematics, but it must appeal to quite mysterious properties or faculties of reason. If we turn to aposteriorism in the second interpretation, the problem of genesis of formal sciences remains unsolvable for radical aposteriorism, but moderate aposteriorism must closer explain the nature of not-determination of sentences by experience. That sentences (all or some) are not determined by experience means that some not experiential factors (*a priori*?) constitute knowledge. These problems are evident in Poincaré. His declarations are not univocal. On the methodological level, Poincaré is certainly a moderate apriorist for his account of arithmetic. However, there are difficulties in qualifying him on the genetic level. We can find his declarations which suggest genetic empiricism, but also locutions (as quoted above) which are rather in spirit of nativism. Thus, Poincaré's conventionalism is not a full solution of the aposteriorism/apriorism controversy, although as far as the matter concerns geometry and physics, he accepts moderate aposteriorism in the version (a). In what follows, I will look at Ajdukiewicz's radical conventionalism as an attempt to solve this controversy. Quite preliminarily, we can see Ajdukiewicz's view as resulting from the conviction that moderate apriorism is too strong, but the usual (that is, described as above) moderate empiricism too weak. A short account of radical conventionalism can be this. At first, we must outline Ajdukiewicz's theory of language and meaning which his conventionalism is based on [see Ajdukiewicz 1934a]. The meanings of expressions in a language L generate rules for accepting sentences of L. Ajdukiewicz singles out three kinds of meaning-rules : axiomatic (they require the unconditional acceptance of certain sentences, e.g. "A is A'"), deductive (e.g.: B follows from "if A, then B and A"), and empirical (the sentence "snow is white" is asserted in the situation when a person asserting this sentence experiences that snow is white). It follows from the foregoing explanations that meanings force meaning-rules. In general, meaning-rules do not determine meanings of expressions; this holds, e.g. for the ordinary language. However, the situation radically changes when we pass to so called closed and connected languages. Roughly speaking, a language L is open if it can be extended to a new language L' (languages are always open relatively to other languages) without changes in old meanings; otherwise, L is closed. A language L is disconnected if there is a non-empty subset X of L such that no element of X is related by meaning-rules of L to its remaining expressions; otherwise, L is connected. An important consequence of the theory of closed and connected languages is this: if L is a closed and connected language, it cannot be enriched by new expressions in such a way that old meanings of its elements are

preserved. Now, the meaning-rules have ranges. The set of sentences accepted on the base of an axiomatic rule is its range. The set of ordered pairs of sentences is a range of a deductive rule. Finally, the set of ordered pairs of experiential data and sentences is a range of empirical rules. The sum of ranges of particular rules generated by meanings that occur in a language L forms its matrix. The matrix uniquely determines the meanings of expressions. Thus, two expressions are synonymous if and only if they have the same coordinates in a matrix; they occupy the same place in the matrix. Thus, possibilities of translations are generated by matrices. For Ajdukiewicz, mature, particularly scientific, knowledge is expressed in closed and connected languages [see Ajdukiewicz 1934b]. The set of meanings of a closed and connected language L is its conceptual apparatus. From general theorems on closed and connected languages, and their matrices, one can infer that two conceptual apparatuses are either identical or mutually non-translatable. The acceptance or rejection of sentences is always related to a definite language L. If L is closed and connected, empirical situations do not force which sentences are accepted or rejected, because we can always change conceptual apparatuses. For Ajdukiewicz, this is an essential strengthening of usual conventionalism. For Poincaré and Duhem, we have freedom in adopting theoretical principles, because they are hidden conventions. For Ajdukiewicz, also our experiential reports are closely related to conceptual apparatuses. Since every conceptual apparatus produces a world-perspective, we can say that theories and observational reports are accepted not absolutely but relatively to world-perspectives. This is why Ajdukiewicz called his conventionalism "radical", contrary to moderate view of Frenchmen. Ajdukiewicz notes several consequences of his conventionalism for philosophy of science, for example that theories are not determined by experience [see Ajdukiewicz 1934a, 1934b, and comments in Giedymin 1982, ch. 4; Jedynak 1993; Pearce 1988; Siemianowski 1993; Wolenski 1989, ch. X]. However, I am more interested in general epistemological consequences of Ajdukiewicz' ideas. At first, let me note that Ajdukiewicz quite deliberately stated his view in pragmatic, not semantic terms. He was afraid that semantic concepts could produce antinomies, like the Liar. For this reason, he states meaning-rules as concerning acceptance, not truth of sentences. However, it does not mean that sentences are lacking truth-values. Looking at truth pragmatically, Ajdukiewicz was inclined at that time to connect assertion and truth by the rule:

(r) if a person P asserts a sentence A, he or she is inclined to regard A as true.

There is an important difference between Poincaré and Ajdukiewicz concerning truth:

[Radical conventionalism] differs from the usual conventionalist [point of view] [...] not only by its radical nature but also in its not asserting (in contradistinction to Poincaré) that principles freely adopted as axioms and interpretations based on conventions are neither true nor false but simply useful [...]. On the contrary, we are inclined to characterize these principles and interpretations as true so long as they occur in our language. [Ajdukiewicz 1934b, 86]

However, there is a problem whether this account of truth implies or not that truth is relative. This point is not clear in Ajdukiewicz. Later, when he was accused of relativism, he defended himself by pointing out that meaning-rules generated that senses of expressions were relative, not their truth. However, this defence is not quite convincing. Ajdukiewicz also compares radical conventionalism with Kant's epistemology:

[...] our position does not forbid us to assume this or that as fact although we have pointed to the dependence of empirical judgements on the conceptual apparatus selected and not alone on the raw material of experience. On this point our view is close to the Copernican idea of Kant, according to which knowledge of experience depends not only on the material of experience but also on the apparatus of categories used in working up this material. However, in Kant's philosophy this apparatus of categories is rigidly connected with the nature of man (though the possibility that it can change is not excluded). For us, on the contrary, this conceptual apparatus is rather a plastic affair. One alters it continuously, either involuntarily and unconsciously. But so long as a man practises articulated knowledge, he must stick to some such conceptual apparatus. [...] There is another essential difference between the Kantian conception of knowledge and the one proposed by us [...] In Kant's philosophy, part of the world-picture which emerges from our process of knowing consists of perceptual data formed by the pure forms of the intuition and the categories. So to speak, perceptual data are the colors in which the world-picture is painted, the painting itself, of course, being done in strict accordance with the patterns of the forms of the intuition and the categories. To us, however, the world-picture which consitutes the products of the knowing activity is not a coloured picture, if experiential data be colours. Our world-picture consists rather in just the meaning of expressions; and in these experiential data are not contained. The world-picture is constructed entirely of abstract elements. The role of perceptual data consists only in this: the conceptual apparatus having already been selected, in terms of it, perceptual data determine which of the elements in the conceptual apparatus are to enter the world-picture. [Ajdukiewicz 1934b, 86-87]

This quotation contains rather metaphors than literal theses. Fortunately, it is possible to interpret it in the frameworks of the aposteriorisrn/apriorism dispute. We can say that sentences forced by axiomatic and deductive meaning-rules are analytic, but these forced by empirical rules are synthetic *a posteriori*. This gives an interpretation of Ajdukiewicz's view as moderate aposteriorism based on the analytic/synthetic distinction. However, a closer inspection shows that this interpretation does not fit Ajdukiewicz's intentions. His conventionalism implies moderate aposteriorisrn in the version (b): no sentence is fully determined by experience. Now what about the *a priori* in this picture? Ajdukiewicz is interested only in articulated knowledge, that is, knowledge dressed in linguistic devices, where language is not only a representation of knowledge, but above all the condition *sine qua non* of any articulated cognitive activity; every knowing subject is inscribed in a language. Obviously, language introduces *a priori* elements into knowledge. They are *a priori* in a relative sense, because they are prior to concrete acts in which they participate. However, Ajdukiewicz nowhere states that having a language is independent of experience. The empirical theory of the genesis of language is fully consistent with his epistemology. The sum of radical conventionalism and the empirical account of the genesis of language leads to a weakening of Kantian position on which *a priori* is independent of any experience. Radical conventionalism being a strengthening of Poincaré's conventionalism is also a weakening of his apriorism to moderate aposteriorism. Later Ajdukiewicz abandoned radical conventionalism (in the fifties and sixties, he tried to elaborate radical empiricisms, but I do not enter here in this unfinished attempt):

> [..] I claimed that between the meaning of expressions and the rules of meaning [...] two relations hold. I believed that the meaning-rules are invariant under the exchange of synonymous expressions, i.e. the meaning-rules remain unchanged if the name of one or two synonymous expressions is replaced in them by the name of the other expression. I also claimed that the inverse relation holds, for I was inclined to believe that if the meaning-rules are invariant under interchange of certain expressions, then those expressions are synonymous. These two assumptions made it possible for me to give the definition of the equality of meaning of two expressions, according to which two expressions are synonymous in the language *L* if and only if the meaning-rules of *L* are invariant under the interchange of those expressions, in other words, if the meaning-rules say the same things about both expressions. [Ajdukiewicz 1964, 314-315]

This theory of language was challenged by Tarski. His objection was this. Consider a language based only on axiomatic and deductive rules consisting of predicate logic with two additional axioms (1) $A \neq B$, and (2) $B \neq A$. Both (1) and (2) are invariant modulo interchanging of A and B. In other words: the matrix of our language is invariant under this interchange. This means that A and B are synonymous. However, (1) and (2) imply that both constants have different denotations, what contradicts a fundamental assumption: if two names are synonymous, their denotations are identical. Ajdukiewicz recognized this objection as unavoidable and rejected the idea of closed and connected languages. Now, since radical conventionalism is essentially based on the premise that such languages exist, this view had to be also abandoned. Ajdukiewicz's further development went to radical aposteriorism, a view based on the view that only empirical meaning-rules are present in our language. However, there is a question investigated by some scholars, for example, Jerzy Giedymin [see Giedymin 1982, ch. 4], which concerns epistemological consequences of retaining three kinds of meaning-rules and admitting open languages [see also Jedynak 1993]. Certainly, this perspective does not imply that two conceptual apparatuses are identical or non-translatable. Yet we can defend moderate aposteriorism in the version (b): no sentence is fully determined by experience. Anyway, the idea that the *a priori* in our knowledge is provided by meaning-rules seems an important consequence of Ajdukiewicz's conventionalism. It gives a literal sense for Quine's famous metaphor concerning knowledge (lore) inherited from our *precedessors*:

> The lore of our fathers is a fabric of sentences [...] It is a pale grey lore, black with facts and white with conventions. [Quine 1963, 406]

This statement can be translated (keeping Quine's colour-metaphor) into Ajdukiewicz's way of speaking as: "Our knowledge is a fabric articulated in sentences [...]. It is pale grey, black with facts and white with meaning-rules."

Yet there is a problem whether it is possible to extract axiomatic and deductive meaning-rules as forcing autonomous stock of knowledge: analytic sentences. Quine is against, Ajdukiewicz position in this respect is not univocal. Yet there is a question for Quine: is his aposteriorism radical or moderate? This quetion is legitimate, because the rejection of the analytic/synthetic distinctions does not decide which form of aposteriorism appears as consistent with the standard account of deduction.

References

Ajdukiewicz, K.

1934a   Meaning and Language, in *Ajdukiewicz 1978*, 35-66; German original appeared in 1934.

1934b   The World-Picture and the Conceptual Apparatus (tr. by J. Wilkinson), in *Ajdukiewicz 1978*, 67-89; German original appeared in 1934.

1935   The Scientific World-Perspective, in *Ajdukiewicz 1978*, 111-118; German original appeared in 1935.

1947   Logic and Experience, in *Ajdukiewicz 1978*, 165-180; Polish original appeared in 1947.

1950   *Problems and Theories of Philosophy*, tr. by H. Skolimowski and A. Quinton, Cambridge : Cambridge University Press, 1973; Polish original appeared in 1950.

1964   Empiricism and the Problem of Meaning (tr. by J. Giedymin), in *Ajdukiewicz 1978*, 306-319; Polish original appeared in 1964.

1978   *The Scientific World-Perspective and Other Essays*, ed. by J. Giedymin, Dordrecht : D. Reidel.

Coniglione F., Poli F. and Wolenski J. (edited by)

1993   *Polish Scientific Philosophy The Lvov-Warsaw School*, Amsterdam : Rodopi.

Giedymin, J.

1982   *Science and Convention*, Oxford : Pergamon Press.

Jedynak, A.

1993   Conventionalism in Ajdukiewicz, in *Coniglione, Poli, Wolenski 1993*, 299-312.

Pearce, D.

1988   Remarks on Ajdukiewicz's Radical Conventionalism, *Reports on Philosophy* 12, 1988, 73-82.

Poincaré, H.

1903   *Science and Hypothesis*, tr. by W. J. G., Scribner, New York 1907; French original appeared in 1903.

Quine, W. V.

1963   Carnap and Logical Truth, in *The Philosophy of Rudolf Carnap*, ed. by P. Schilpp, La Salle : Open Court, 385-406.

Siemianowski, A.

1993   On Certain Consequences of the Radical Conventionalism Hypothesis, in *Coniglione, Poli, Wolenski 1993*, 313-318.

Wolenski, J.

1989   *Logic and Philosophy in the Lvov-Warsaw School*, Dordrecht : Kluwer.