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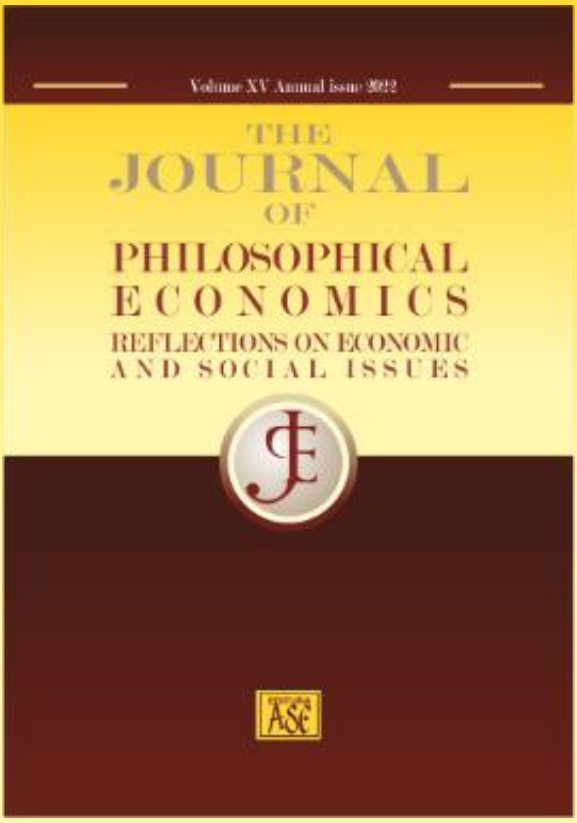

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Abstract: The conception of the founder of the Austrian School in his book on the philosophy of social sciences has been described by the supporters of this school as a total methodological individualism, upholding the absolute specificity of these sciences to those of nature, and as rejecting the use of mathematics in economics.

On the contrary, we shall see that for Carl Menger the human individual was only the fundamental element of socio-economic structures, not reducible to it. Economic theory was to be inspired by the 'atomism' of natural sciences and determine the causes, effects, and laws of the studied phenomena, with the aim of predicting and controlling them. Empirical study had to unite with conceptual abstraction and mathematics in the degree determined by the simplicity or complexity of the field of research.

These characteristics of C. Manger's conception, like others, make us assume an important (but unconfessed) influence of A. Comte's positivism. However, in order to prove it, we will try to restore his true philosophy of science, warped by the neo-positivism of the energeticist scientists and of the Vienna Circle.

Keywords: philosophy, science, economics, Austrian School, positivism, historicism, holism, natural laws, social laws, scientific methods, methodological individualism

Carl Menger and the philosophy of science

Ensemble of Menger's work

Carl Menger (1840–1921) is widely regarded as the founder of the Austrian School of economics, having formulated in his book *Principles of economics* ([1871] 2004), almost simultaneously with W.S. Jevons and L. Walras, the marginalist economic theory, a supposed subjectivist alternative to the English classical objective theory of the labour-based value. The book that comprised an exposition of general conditions of economic activities (goods, preferences, subjective values, exchange values, prices, commodities, trade, money – in fact, the concepts of the market economy) was only the first part of a planned four-volume cycle covering the entire economic system. The second should have contained the theory of income, credit, and paper currency, the third – applications to the theory of production and trade, and the fourth – a reforming criticism of the economic system of that time. J. Schumpeter, in a tribute article published on Menger's death, wrote of *Principles* that they 'demolished the existing structure of a science and put it on entirely new foundations', but that they constituted, in his life, 'a single decisive achievement that made scientific history' (Schumpeter 1921, pp. 80, 83). However, in the 50 years that followed in Menger's life, this project was not finished by him but, one might say by his disciple (not direct student, however), E. Böhm-Bawerk (1851–1914), through the *Positive theory of capital* (1894).

On the other hand, in 1883, Menger published a fundamental work on the philosophy of sciences, *Investigations into the method of the social sciences, with special reference to economics* (Menger [1883] 1985). The main struggle that he gave through his *Investigations* was not with the English classical theory but with the Historical School in Germany. To support his ideas, Menger not only resorts to criticism (of the Kantian type) of theories of his antagonists but develops a whole philosophy of natural and social sciences, through which he tries to avoid both historicist relativism and the absolutist speculative approach. It was followed in 1892 by a short work on the *Origin of money*, summarizing the final chapter of *Principles*. For references to the text of *Investigations*, I will use its PDF format (made available to the public by the

Mises Institute, the 1985 edition) and the electronic numbering of the pages, continuous for the texts of the prefacers and Menger.

F. A. Hayek, Nobel laureate and one of his most important disciples, considered (in his introduction to the 1934 English translation of *Principles*) that:

> 'What is common to the members of the Austrian school, what constitutes their peculiarity and provided the foundations for their later contributions, is their acceptance of the teaching of Carl Menger'. 'As a polemic against the claims of the Historical School to an exclusive right to treat economic problems, the book [of *Investigations*] can hardly be surprised. Whether the merits of its positive exposition of the nature of theoretical analysis can be rated as high is, perhaps, not quite certain.' (Hayek [1934] 1954, pp. 2, 23)

Furthermore, L.H. White, in the preface to the 1985 edition of the translation of *Investigations*, when the orthodox doctrine of the Austrian School had already stabilized under the influence of L. Mises, wrote (in contradistinction to Hayek) that 'it cannot be said that current Austrian Methodist views derive predominantly from Carl Menger' (White 1985, p. 10). Except for the theoretical 'positive exposition' from *Investigations*, it would be concluded that the disciples exclusively followed Menger's conceptions from *Principles*.

However, I think that the philosophy presented in the *Investigations* is not a break from the ideas in *Principles* but their development and clarification, the most important of which I will be presenting in the paper. I will not be focusing in what follows on the polemical ('destructive') side of Menger's works but on its constructive side ('positive', as Hayek called it, and on which he proposes to substitute or add the approach of the Historical School). On the contrary, I find it more interesting, especially for the goal pursued here – the connection with Conte's positivism. The polemic relative to the 'method strife' (*Methodenstreit*) between the philosophers of natural and social sciences has been sufficiently studied so far, initiated by Menger and which continues today (Dilthey [1883] 1989, pp. 56-71, 192-206, 436-440; Schumpeter 1912, pp. 152-201; Mises [1933] 2003, pp. 1-136; Popovici 2000, pp. 9-11 [1]).

To avoid (as far as possible) the suspicions that I could have forced the rapprochement of Menger to Comte, I preferred, for the most important ideas, not to paraphrase but to quote their very words. Moreover, following the 'semantic holism' of W.O. Quine, I believe that the real meaning of ideas can

only be understood by placing them in their most complete contexts. So, I sought to give a concentrated but faithfully structured picture of the systems of philosophy of science (admittedly, of unequal magnitude and importance) conceived by the two thinkers in the two halves of my paper.

Specifics and basis of economics

A first objection that Menger makes to the German Historical School is that it neglects the autonomy of real economy by tying it too closely to socio-historical development (Menger [1883] 1985, pp. 97-8).

According to Menger, 'by *economy* we understand the precautionary activity of humans directed toward covering their material needs; by *national economy*, the social form of this activity'. He finds that the fundamental element of the needs is 'the goods offered directly to humans by nature (both the consumption goods and the means of production concerned), and the desire for the most complete satisfaction of needs possible (for the most complete covering of material needs possible). All these factors are ultimately given by the particular situation, independent of human choice'. Therefore, 'the starting point and the goal of all economy (need and available quantity of goods on the one hand, and the possible completeness of satisfaction of the material needs on the other) are ultimately given to the economic human, strictly determined in respect to their nature and their measure' (Menger [1883] 1985, pp. 86-7).

Menger shows that there exists a *bounded human freedom* because 'what in this respect depends on our power and volition is to travel the road from a strictly determined starting point to a just as strictly determined goal... in as economically a way as possible'. Moreover, the road is 'by no means determined a priori [and] only one road can be the most suitable'. From this, Menger concludes that, for a given economic situation, 'only one form of enterprise is conceivable, namely, that in which a strictly determined economic orientation prevails' (Menger [1883] 1985, pp. 240-41). In other words, he believes that the optimal economic solution is even unique, which (fortunately) is not always the case. It is certain that the value of optimum is unique for all optimal solutions to the same problem, or for dual problems: either we maximize the satisfaction

of needs (with limited resources), or we minimize the consumption of resources (with limited satisfactions).

Menger supports the characterization of the *economic man* by individual interest, as well as by independence from external influences, as necessary abstractions (like those in other sciences) but rejects their generalization to the real *social man* (Menger [1883] 1985, pp. 105-108, 110). 'Among human efforts, those which are aimed at the anticipation and provision of material (*economic*) needs are by far the most common and most important'. Therefore, economics 'cannot provide understanding of human phenomena in their totality or of a concrete portion thereof, but it can provide understanding *of one of the most important sides of human life*' (Menger [1883] 1985, p. 110). Here we have a resolute statement of the importance of economics, based on a surprising primordiality of economic determinism in social life. This specificity of the economic field is interpreted by L.H. White as expressing '[a] research program which is commendably free of pseudo-natural scientific approaches to economic subjects' and '[of] distinctly social-scientific methods' (White 1985, p. 10).

However, Menger clearly states, even in his preface to *Principles*, the ontological and methodological similarity with natural sciences: 'I have been able to demonstrate successfully that the phenomena of economic life, like those of nature, are ordered strictly in accordance with defined laws. [...] I wish to challenge the opinion of those who question the existence of laws of economic behaviour by reference to human free will, since their argument would deny economics otherwise the status of an exact science' (Menger [1871] 2004, p. 48). We will see further how this limited freedom will be a condition of the possibility of exact economic science.

General classification of sciences and its application to economics

A second error of the German Historical School, derived in part from the first, was to confuse historical knowledge and research with the totality of science (Menger [1883] 1985, p. 100).

The purpose of *scientific research* of phenomena in the area of reality, shows Menger, is, on the one hand, the ontological and analytical understanding of the reasons (causes) of existence and of specific qualities of phenomena, and on the other, intuitively and synthetically – their knowledge through the formation of a mental image, I would say of a model (Menger [1883] 1985, p. 66).

In any field, the research would be divided into three *orientations*: *historica*l, *theoretical* and *practical* (applicative); they are not confused, they are all necessary and only together form the science of a field. In economics, Menger finds them in sociology and economic history, economic theory, respectively economic policies and finance (Menger [1883] 1985, pp. 61, 66, 98, 229-236).

Historical orientation deals with a particular phenomena of social life. Because 'there probably is scarcely one phenomenon of this life [of nations] which would not feel the influence of all the factors which are determinative in shaping human phenomena', the historian must 'at the same time interpret the relevant phenomena by way of political, cultural, and economic conditions of the nations as far as they have affected great historical facts'. '*Historical* understanding of economy and its phenomena can be attained "only in their connection with the social and political development of the nations"' states Menger (Menger [1883] 1985, pp. 58, 98-99) quoting at the end the opinion of C. Dietzel.

Theoretical (abstract) *orientation* seeks *control* (through human action) and *prediction* of phenomena by studying their regularities, the links between them and their changes (evolutions). They all express themselves through *types* (classes), *laws* (descriptive or causal) and *conditions* (of their application). The objectives of any theory are achieved when, 'on the basis of these laws [of coexistence and succession of phenomena], conclusions can be drawn beyond

direct experience, about the occurrence of future phenomena, or about the coexistence of simultaneous phenomena not directly observed' (Menger [1883] 1985, pp. 77-8, 116, 168-70).

Still in *Principles*, Menger stated resolutely: 'All things are subject to the law of cause and effect. This great principle knows no exception'. He even based his famous classification of economic goods by various degrees on their place in the causal chain of production and consumption. 'It is necessary, in the manner of all other empirical sciences, to attempt to classify the various goods according to their inherent characteristics, to learn the place that each good occupies in the causal nexus of goods, and finally, to discover the economic laws to which they are subject' (Menger [1871] 2004, pp. 51, 56-57). As it can be seen, the existence of causal laws, control and prediction are characteristics that bring (in Menger's view) social sciences closer to the natural ones, despite those that denied the existence of social-historical laws (Schumpeter 1912, p. 170).

Practical orientation looks for the principles and conditions of possible human actions and it rests on a theoretical one but is not reduced to it (Menger [1883] 1985, p. 62). Menger deals critically with historical orientation, constructively with the theoretical one, and none at all with practice.

Corresponding to the approach they use (inductive or deductive), theoretical sciences would divide, in turn, into *realist-empirical* (sciences) and *exact approaches*. I could say that in physics, theoretical and experimental physics would correspond to them, as the historical and practical orientations would be returned to cosmogony, respectively to a part of technology.

Realist-empirical approach is inductive and tries to express phenomena and laws in all their complexity but due to the imperfections of the method (the impossibility of verifying all cases), the types and laws reached (and which exceed empirical appearances) are not strict (but present exceptions), and the representation of historical changes and developments is all the more difficult (Menger [1883] 1985, pp. 79-80, 87, 133-34). Empirical and statistical determination of economic regularities is possible and substantially helps to understand, predict and control economic phenomena. These regularities are due to the fact that 'people, in their economic efforts, [...] are predominantly

and regularly governed by their individual interests' (Menger [1883] 1985, pp. 86-7).

Exact approach (possibly mathematical) is deductive and can be either in axiomatic a priori form – briefly and ironically rejected by Menger as belonging to some unrealistic Frenchmen –, or under one (unnamed, because it completely assimilates it to the exact one), preferred and explained by the author. In the latter, the researcher must determine the simplest elements of phenomena and measure them through the analysis of reality; next, he must reconstruct with their help the exact quantitative laws of more complex phenomena (Menger [1883] 1985, pp. 60, 83, 85, 86); I would say – like a building made of stone blocks.

It follows that the exact method is not so independent of the empirical one as it might seem from the classification of Menger (for I would add that any empirical study uses, at least at the beginning, certain theoretical concepts necessary to choose and classify the studied phenomena). L.H. White writes that 'we can make sense of "exact laws" as theoretical propositions which (necessarily) take an "if-then" form' (White 1985, p. 12), but this would mean reducing them to mere implications, not counting either the origin of the premises or the nature of conclusions. I think we can recognize in Menger's description the Cartesian method, usually called deductive, although it would be more correct to be called an *analytic-synthetic* or *inductive-deductive* method (Descartes, *Rules*, XI-XIII; *Discourse*, II; Popovici 2014c, §3.1).

Even in his preface to *Principles*, Menger confessed that he aimed to 'investigate the manner in which the more complex economic phenomena evolve from their elements according to defined principles. In the same book, at the beginning of the study of price formation by exchange, Menger stated: 'I shall proceed in accord with the methods generally followed in this work, beginning with the simplest phenomena and gradually passing on to the more complex phenomena' (Menger [1871] 2004, pp. 46-7, 194).

Moreover, exact economic theory shows us 'what quantitative effects would be produced by a defined quantity of the influence in question' (Menger [1883] 1985, p. 110), and in *Principles* it shows that it proceeds like common economic practice: 'the quantities of goods available, at any time, [...] are set by existing

circumstances; [...] men do calculate [them] with an exactness sufficient for their practical affairs' (Menger [1871] 2004, pp. 89-90). Therefore, contrary to the restrictive interpretations of his disciples (starting with Böhm-Bawerk himself), his concept of an exact approach meant not only a rigorous deductive method but also a quantitative-mathematical one, even if not necessarily experimental or even measurable (a task he left to the realist-empirical approach).

Natural needs and resources are an objective, qualitative and quantitative basis for developing exact laws of the entire economy (as a social form of this activity of economic man), and they have 'a significant analogous to that which the exact natural sciences offer us in respect to natural phenomena' (Menger [1883] 1985, pp. 47, 87). Here is a supplementary statement, more general than that of the existence of laws, which contradicts the absolute specificity of social sciences. Finding exact economic laws would be possible precisely because of the strict determination of economic phenomena and of limited economic freedom, while general real social phenomena are hybrid (and only partially economically determined), so the realist-empirical orientation could not reach exact laws (Menger [1883] 1985, p. 83).

I believe that the imposition of such a strict (Laplacian, mechanistic) determinism on the economic behaviour is due both to Menger's tendency towards objectivity and to his desire to allow partial mathematization of the exact approach. Above the mathematical statistics of the realist-empirical approach, he sees, however, only classical mathematics (algebra, differential and integral calculus) and not the probability theory (already used by Cournot and Jevons, but not by Walras), which he believes, perhaps, to be exclusively subjective (ignoring the objective interpretation of probabilities). Therefore, he could not see the possibility supported by data and statistical verifications of rigorous probabilistic economic laws, in which, randomness would reflect human freedom, while distribution functions and the rules of processes – the bounds and restrictions imposed on it by reality (Popovici 2013).

Exact sciences work out strict types (concepts, classes) and strict laws (without exceptions), which are absolute ('independent of space and time', including historical epochs) and can easily express changes and developments. Menger indicates (rather simplistic, but he had not studied mathematics) the

establishment of a reference base and differences from it as the exact method of solving the transformation problems (Menger [1883] 1985, pp. 82-3, 131). A more complex solution, in the case of functional laws, would be to change the parameters or even the shape of functions.

In exact sciences, '*whatever was observed in even only one case*, must always put in appearance again, under exactly the same current conditions' (Menger [1883] 1985, p. 83), a requirement that must be interpreted as a reinforced (but somewhat utopian) expression of the goals of the theoretical orientation, pointed above. Moreover, following the example of Newtonian physics, he idealizes the ability of an exact theory, even mathematized, to be perfect and eternal.

In each field of reality, for phenomena of lower complexity, it is easier to draw up exact laws, and for more complex ones – empirical laws. The first are of the abstract world, the others – of the real (phenomenal) world. The two orientations are not complementary, i.e., relating to different areas but necessary in each area, leading to a specific understanding (Menger [1883] 1985, pp. 90-91, 95). As an example, given by Menger, in the phenomenon of price dependence on the variation of supply and demand, 'the exact law states that, *with defined presuppositions* [previously indicated], an increase in need, defined by measure, must be followed by an increase in prices just as defined by measure. The empirical law states that an increase in need *as a rule* [commonly, frequently] is actually followed by one in *real* prices, and, to be sure, an increase which as a rule stands in a certain relationship to the increase in need, even if this relationship by no means can be determined in an exact way' (Menger [1883] 1985, p. 95) but only statistically, I would say (possibly – with a certain degree of confidence).

'Only where one or the other orientation leads to no results, whether because of insufficient objective presuppositions or for reasons involved in the technique of research, does one or the other orientation of research dominate..., and this only as long as this relationship persists' (Menger [1883] 1985, p. 91). It follows that none of the approaches can be invalidated by principle (or, I suppose, if some of their consequences are invalidated, as some philosophers of science

would demand), but only for reasons of infertility, temporary or relative to a field.

If empirical laws are not absolutely accurate, neither can exact laws be verified absolutely empirically (Menger [1883] 1985, pp. 91-2). Because mere empiricism is not capable of accuracy, it cannot be used as a calibration method (just as even simple exact theory cannot verify empiricism). Here appears to Menger (as a means of combating opponents of exact orientation in economics) the comparison with 'the mathematician who wants to correct the principles of geometry by measuring real objects, without reflecting that the latter are indeed not identical with the magnitudes which pure geometry presumes or that every measurement of necessity implies elements of inexactitude' (Menger [1883] 1985, p. 93). Thus, it turns out that mathematics was included among the methods of exact economic science, and it is contradicted once again (now just explicitly) Hayek's statement that Menger 'does not even refer to the mathematical method in any of his writings on methodology' (Hayek [1934] 1954, p. 5).

I think that neither, in general, nor from Menger's example, follows the impossibility of any verification of exact laws of reality. The verification of a theory includes, on the one hand, the establishment of internal coherence of a set of laws relative to a field, and on the other, that of external adequacy to reality. Of course, the first verification cannot be done in any way empirically but through logic, mathematics and semantic analysis, taking into account the Duhem-Quine thesis (the necessity of analysing the whole statements of the theory) and the 'semantic holism' used by Quine in the criticism of neo-positivism (Popovici 2014a, §3.3.4).

External adequation checking can be done directly on the respective laws, or indirectly – through experimental predictions resulting from the laws. A science contains not only types and laws (exact and empirical) of phenomena but also rules of experimentation, verification, and measurement, with limits of tolerance, which Menger also mentioned (all related to the applicative approach based on the theoretical one but also dependent on the used technical means). We saw that both theoretical orientations (exact and empirical) are necessary, so these rules would also have a mixed orientation. If there were no rules of correspondence between the exact theory and the empirical one, it would not be

possible to apply the theory in practice either (in the particular example – of the 'exact' geometry to a real practical field).

Without the possibility of validating external adequacy, we would not be able to accept or reject a coherent (let's say exact) theory, nor even certain scientific (even exact) hypotheses. Moreover, we could not choose between two theories, both equally internally coherent. Precisely in this way, experimentally (but not purely exactly, nor purely empirically) and with a certain degree of adequacy, one could choose, at the astronomical level, between Newtonian and Einsteinian mechanics. Likewise, I believe that Keynesian economic theory proved its relative suitability to reality by the successes of its application in the years after 1945, not being sufficiently effective afterwards due to the markedly changed socio-economic conditions.

History, states expressively Menger, 'has the task of making us understand *all* sides of *certain* phenomena, but the exact *theories* have the task of making us understand only *certain* sides of *all* phenomena' from their field of reality (Menger [1883] 1985, p. 102); both of which are therefore partial. Differentiation between 'explanation' in natural sciences and 'understanding' in historical (socio-human) sciences promoted by W. Dilthey ([1883] 1989) was not yet current currency in philosophy – fortunately, I would say, because explanation and understanding are necessary in all sciences, even if in different proportions (Popovici 2014a, §§3.3.2, 4).

'[Empirical] realism in theoretical research is not something higher than exact orientation but something different'. From this point of view, shows Menger, 'no *essential* difference between the ethical [social] and the natural sciences exists, but at most only *one of degree*' (Menger [1883] 1985, pp. 81, 93). It would seem that this means a *monism of methods* (the applicability of a unitary method to all domains of reality). On the other hand, Menger explicitly states the necessity of suitability of the method to the field, and otherwise, its small importance for true researchers (Menger [1883] 1985, pp. 49-50, 158-160). The apparent paradox can be solved taking into account that, in its conception, as we have seen, all methods, approaches and orientations (sciences) – exact, empirical, historical and practical – are necessary in explaining each domain of reality, and the proportion of each in the ensemble depends on the complexity

of a domain (from the physical-chemical to the social-historical one), the result of their combination and interaction being thus unique. I have called elsewhere this conception a *gradualism of methods* (Popovici 2014a, §1; 2018, p. 114).

Synthesis of individualism with organicist holism and of theory with history

The third mistake that Menger reproaches to the German Historical School is the organicist (holistic) approach in sociology and economics (with all the recognition of its justification in biology). In addition to the motivation for the incomplete integration of society and economy (compared to that of an organism versus organs), the analogy is incomplete, Menger shows, also due to the fact that, unlike organs, the social 'elements' (the humans) are conscious and relatively autonomous. He accepts the name of atomism, given by opponents to the exact advocated method, and even states that the charge of atomism in the sense of the necessity to start from the simple elements in order to explain the complex ones (as yet envisaged by Descartes); it can be applied not only to the exact approach in economics but 'to all other sciences, and, indeed, as an exact science' (Menger [1883] 1985, pp. 116-17). The atomistic approach is used even in biology, and sociological atomism would just have an advantage over the physical-chemical one: if the actual atoms are rather little known (at that time they were still in the stage of hypothesis), human atoms are well- known to anyone (Menger [1883] 1985, pp. 162-65). I would state that this knowledge of human individuals was more of the order of common sense than scientific. From this argument it follows that Menger considered the fields of reality and sciences corresponding to them to be ordered in an increasing hierarchy of complexity (physics, chemistry, biology, human society and, as we shall see, even inside the last), in which the wholes on one level had as elementary parts (atoms) the wholes on the next lower level.

Hayek pointed to one of Menger's merits, 'his emphasis on the necessity of a strictly individualistic or, as he generally says, atomistic method of analysis' (Hayek [1934] 1954, p. 24), and L.H. White states, more generally, that '[the] members of the [Austrian] school have employed a common method of analysis, namely one rooted in subjectivism' (White 1985, p. 10).

However, his social 'atomism' is neither a reductionism, nor a pure methodological individualism, because Menger believes that for his approach 'there can be no rational question of a confusion of [economic] individual with national economy' (Menger [1883] 1985, p. 117) in its entirety, nor of considering the latter as 'a juxtaposition of isolated individual economies' (Menger [1883] 1985, p. 217). Society and the national economy are, for him, 'aggregates of institutions', they are 'complexes' (structures, I might say) of interacting individual and group micro-components. In the body, each organ 'serves the normal function of the whole, conditions and influences it, and in turn, is conditioned and influenced by it in its normal nature and its normal function. Also, in a number of social phenomena, we meet with the appearance of reciprocal conditioning of the whole and its normal functions, and the parts, and vice versa' (Menger [1883] 1985, p. 170).

Therefore, *methodological individualism* is valid only as the starting point of its methodology. Between reductionism and holism, for the exact social sciences (and, perhaps, even more so, for the empirical ones), Menger chooses a synthetic path, which I have called *interactionism* (Popovici 2014a, §2.1). Thus follows another analogy between the social and natural sciences, which goes against one of the old prejudices, which R.E. Backhouse takes up in a book on the history of economic science, when he states that, 'in contrast to Jevons and Walras, Menger was not seeking to make scientific economics according to the standards of contemporary physics' (Backhouse 2002, p. 352). Taking into account the trends and conclusions (inconvenient for the later orthodoxy of the Austrian School) which Menger's fundamental book contains, it becomes explainable why L. Robbins (promoter of marginalism in Britain), in his lectures on the history of economic thought, and J. T. Salerno, in a study, dedicated to the founder of this school, do mention *Investigations* only as a reply to the Historical School (Robbins [1998] 2000; Salerno 1999).

I would also like to somehow clarify the issue of Menger's 'subjectivism'. In *Principles*, the word 'subjective' appears extremely frequently because the author based his theory on the element of individual's satisfaction towards various goods (grounded, as we have seen at the beginning, on the natural and objective needs of humans). Satisfaction varies in relation to the individual and the good, and even into the same individual (Menger [1871] 2004, p. 148).

However, in *Investigations*, 'subjective' appears only twice: the first (Menger [1883] 1985, p. 141), related to the nature of various economic objects (based precisely on 'satisfaction'), and the second, which describes the transformation of legal laws (through religion, education, habit, therefore through the interaction of people), from subjective rules to objective social legislation. If this rarity of the term is explainable in a book oriented towards exact science and towards rigorous laws of phenomena, I will try to show that, even in *Principles*, initial subjectivism suffers (through the author's examination of the intervention of social relations) a metamorphosis in the same sense as legislation, even if not declared explicitly.

According to Menger, for measuring use value (satisfaction-supported), 'we must investigate: (1) to what extent different satisfactions have different degrees of importance to us (subjective factor), and (2) which satisfactions of concrete needs depend, in each individual case, on our command [the available quantity] of a particular good (objective factor)' (Menger [1871] 2004, p. 122). The result (total use value, which is a decreasing function of quantity) remains subjective (but, I would say, to a lesser degree). When negotiating between two people with different preferences and relatively balanced economic situations, 'prices will... have a tendency to settle at the average of the extreme possible limits' (Menger [1871] 2004, p. 196). Therefore, these prices, depending on the subjective values of each party, become intersubjective.

I would add that, in conditions of free competition, the more negotiators on one side and the other (with preferences whose variations compensate each other), the smaller the fluctuations of this average will be, and in a more or less long time, the average will stabilize by balancing demand with supply, becoming a social value. Like any human reality, it is only relatively objective (not completely, because it results both from the relationships of individuals and groups, and from their interactions with nature). The relatively invariant core of the total quantity of the commodity which characterizes this equilibrium is partly determined (directly or indirectly) precisely by the qualities and sizes of natural needs of humans, which are the ground for the satisfaction offered to individuals by the respective good.

Even in case of existence of a monopoly, Menger concludes that 'for each quantity of a good that a monopolist decides to sell, the price is determined

independently of his will', because, for example, in the case of several buyers for the same good, the price depends on the competition between the two better placed buyers (Menger [1871] 2004, p. 203). Moreover, in any situation, 'there is only *one particular* price and only *one particular* quantity of the monopolized good brought to market that corresponds most exactly to his economic interest' (Menger [1871] 2004, pp. 215-16). Therefore, in this case too, the accentuated subjectivism of the situation is overcome towards an inter-subjectivism with an (almost) uniquely determined result. If in microeconomics subjectivism has its place (even if not as important as the current Austrian School gives to it), in meso- and macroeconomics (at branch and ensemble levels, where economics works with aggregate magnitudes), it disappears almost completely (which explains the refusal of this school of such approaches).

Menger shows that in economics interaction occurs through competition or cooperation (through individual will, but also through social will, conscious or unconscious) between individuals, family households and businesses (Menger [1883] 1985, pp. 217-18). The reduction of results to the practice of individuals can be done directly only through some structuration by mutual understanding, while those that appeared unintentionally (for which the organic analogy is more appropriate) can be explained precisely by an interaction of the parts or by a gradual aggregation of increasingly complex units, and the intentional character is accentuated even for them during their functioning. Menger sketches these processes, thus explaining the evolution of settlements, states and even money (Menger [1883] 1985, pp. 153, 168-182). Unfortunately, in these attempts, the emerging qualities of the whole are too little highlighted.

Even considering the fundamental nature of economic relations within society, indicated above, Menger warns against the tendency 'to expand theoretical economics... into the phantom of a universal theory of social phenomena'. Due to partiality of exact sciences (as well as any others), the realization of such an exact theory '(thought of in its full empirical reality), [...] could assuredly happen only by way of a majority of exact social sciences' (Menger [1883] 1985, pp. 101-102). So, the exact approach is necessary and desirable, but the knowledge of society can be attained only through a collaboration of all approaches (sciences): theoretical (exact and empirical), historical and applied.

Schumpeter pointed out, even before World War I, that following discussions, Schmoller, the head of the Historical School of Economics, 'recognized not only that some of Menger's critical observations were justified but also how essentially similar the causal nexus in social science and natural science is; he also described the explanation of social phenomena as cause and effect and laws'. Schmoller also stated in his *Handbook of the social sciences* that these 'empirical' laws could not be understood without the aid of theoretical abstractions (Schumpeter 1912, p. 170). For his part, I could say that Menger did not refuse history but rather practiced it, both in the final chapter of *Principles* (then resumed in the 1892 paper, on the *Origin of Money*), and in the extensive analysis of the evolution of concepts in the annexes to *Principles* and to *Investigations*. Distanced, both then and later, from the final methodological exclusivism of the Austrian School, Schumpeter observed 'how closely representatives of schools, which are usually considered as essentially hostile, approached each other'. He attributed the subsequent departure of theoretical economics from the historical one to the political trend taken by the latter, like the English Classical School (Schumpeter 1912, pp. 170-73).

At its beginning, the German Historical School had a nationalist stance, tending to the state unification of Germany under the rule of Prussia, as well as to the mitigation of internal social conflicts, which partly explains its holism (an organism-society analogy dating back at least to the beginning of ancient Rome). We can understand from Schumpeter's allusion that then this policy became radicalized in part, becoming socialist or even Marxist. Anyhow, it was an evolutionary trend that would have allowed (at least theoretically) overcoming capitalism as an economic and social order (as happened with Schumpeter himself, as a result of which he was 'eliminated' from the Austrian School by its historians). On the other hand, the exact theoretical orientation promoted economic laws independent of space and time, and thus had, implicitly, a conservative tendency, like the Neoclassical School (Veblen 1901, pp. 71-2, 76-7).

Concerning the theoretical traditions harnessed by Menger in his research, over the German thinkers, Hayek showed that these results constituted a return to some French and Italian authors who kept the connection between value and utility but would demonstrate the low influence of the English

Classical School (Hayek [1934] 1954, pp. 3-4). In contrast, Schumpeter (a much deeper and broader connoisseur of economic history) states that 'the influence of Smith, Ricardo, and especially J. S. Mill is also unmistakable' (Schumpeter [1954] 1986, p. 794), which is confirmed by the frequent references (not always polemical) to the latter and especially to the former, in the historical annexes to his works which I mentioned above. Salerno even stated that 'Menger's ultimate goal was not to destroy Classical economics [...] but to complete and firm up the Classical project' (Salerno 1999, p. 2).

As for the tendency towards synthetic approaches, contemporary to the conception on *Investigations*, Schumpeter stated as early as 1912, that 'in France, [...] nowhere else can we see so clearly that there exists no implicit contradiction between theory and economic history and how little unbiased people doubted that both methods are equally necessary' (Schumpeter 1912, pp. 163-4). I would put this trend, at least in part, on the strong influence (in the second half of the 19th century) of A. Comte's positivist sociological doctrine, characterized precisely by this synthesis.

There is no reference to Comte in *Principles* and only four references in *Investigations* (Menger [1883] 1985, pp. 92, 141, 165, 173-4), three of which are polemical. In two of them, Comte is associated with J. Stuart Mill (mentioned three times in *Principles*, as an economist), and once with H. Spencer (both known as promoters of Comte's positivism in England), so Menger was aware of the existence of the positivist current. However, in the whole book, only a maximum laudatory rating is used, and just against the first: 'such an excellent thinker as Auguste Comte' (Menger [1883] 1985, p. 92). I believe that there are other important proximities of the two philosophies of science, which I will try to highlight further, in their overall context, which will give both a broader foundation to Menger's conception and an extension of positivism to the economic field.

Auguste Comte's positivism

Chronology and architecture of A. Comte's work

The philosophy of A. Comte (1798-1857) is one of the most extensive and influential in the 19th century; but if its author is (rightly) regarded as the founder of scientific sociology, the ground he gave to it is less or not at all known or is distorted. The explanation, at least partially, of this situation lies in the double face of original positivism, one directed towards social sciences, and the other – towards the natural ones. Both groups of sciences were thoroughly well-known by Comte (which has rarely happened in the history of modern science and philosophy) and were considered by him equally necessary to all philosophy.

However, just this vastness and unity were considered inappropriate later and even then, because of the increasing specialization in science and philosophy, since it transformed into a split between the 'two cultures' discussed by C. P. Snow in a famous conference (1959) developed later (Snow 1964). The 'quarrel of methods', which I mentioned at the beginning of the work, was a symptom of this chasm, cultivated afterwards by neo-positivists but also by many followers of the Austrian School, if we speak only about some currents in which we are interested here. In short, the first denied the historical character of the results of natural sciences and tried to extend their methods into the socio-humanities, while the others absolutized the specificity of social sciences (including the economic one), denying (in the name of the essential freedom of individuals) the possibility of laws similar to the natural ones.

A. Comte attended courses of the famous Polytechnic School of Paris and also studied biology-medicine, and then published several short works on political philosophy. Between 1829-41, he gave free and regular lectures (according to a plan announced in advance), which he drafted and published in parallel, under the title *Cours de philosophie positive*, briefly – *Lectures* (1830-42), in 6 volumes containing 60 'lessons' (totalling 4700 pages), which formed a complete philosophical system. In parallel (1831-46), he gave free scientific lectures for common people, published in *Elementary treatise on analytical geometry* (1843) and *Philosophical treatise on popular astronomy* (1844). The introduction to the last volume was also printed separately as a synthetic exposition of his philosophical system, *Discourse on the positive spirit* (1844).

Following a sentimental relationship, Comte changed the orientation of his political philosophy from an objective (based on science) to a subjective one

(supported by feelings and tending to the foundation of a rational religion), which he expounds in a *Discourse on the ensemble of positivism* (1848). He then reformulated and developed his conception into *Système de politique positive*, briefly–*Polity* (1851-54), consisting of four volumes comprising 2900 pages. In addition to several smaller political writings, he published in 1856 the first 800 pages long volume (of 'positive logic', or mathematical philosophy) of a planned *Subjective synthesis*.

More detailed expositions of his life and work are those appeared due to his French disciples Littré (1877) and Levy-Bruhl ([1909] 1913), and a contemporary and quasi-complete one, in English – written by Mary Pickering (1993, 2009). Let us now indicate the rigorous aspects of the two great finished syntheses.

The first three volumes of *Lectures* contain the foundations of general positive philosophy and of natural sciences: i) the principles and parts relating to mathematics and rational mechanics (1830), ii) astronomy and physics (1835), iii) chemistry and biology (1836). The following three volumes constitute the foundation of the science and positive philosophy of society (sociology), with its structural and historical aspects: iv) the theoretical part – static and dynamic (1839); v) the historical part of sociology, from prehistory to the French Revolution (1841); vi) continuation of history, until the moment of publication (1842), followed by the synthesis of the results included in the six volumes.

Polity comprises: i) *Discourse on the ensemble of positivism* and the fundamental introduction (1851), ii) the static theory of society relative to religion (as totalization of society), property, family, language, institutions and social system, with their variations (1852); iii) the dynamic theory of society, with the general laws of evolution and its stages – fetishist, polytheist, monotheist, critical-revolutionary (1853); iv) the project of future society and universal religion, as well as six of his youth writings which anticipated positivism (1854).

I will deal almost exclusively with *Lectures*, and from this, with regard to the features of similarity or distinction with C. Menger (of course, in relation to the whole positivist philosophical system). Therefore, I will indicate the references to *Lectures* more simply by volume number and page, and to *Polity* – together

with the abridged title. The translations of the French quotes are my own versions.

Foundations of A. Comte's positive philosophy

Comte sees his conceptions as a continuation and development of general ideas of Aristotle, Descartes, and F. Bacon, and as for society, those of Hobbes, Montesquieu, and Condorcet. Following Aristotle, he regards philosophy as a general system of human conceptions; from Descartes he takes the idea of hierarchy of sciences and possibility of their mathematization, and from Bacon – their grounding on the observation of phenomena. He wants, along with Hobbes, a realistic approach to society taking into account (like Montesquieu) its dependence on the conditions of the environment and human biology but also (like Condorcet) its continuous progress (I, pp. vii, 62, 150; II, 390, 636, III, 761; IV, 243, 252; V, 701, 710; VI, 266, 301-8, 455, 642, 694-97).

The purpose of positive philosophy is the knowledge of natural and social laws, invariable and in minimal numbers by 'considering each fundamental science in its relations with the whole positive system... under the double ratio of its essential methods and its principal results' (I, 4, 14, 25). Sciences and philosophy are considered 'positive' when their conclusions are based on observable facts (I, p. vii). Therefore, they must exclude from the explanation the first (initial) and last (final) causes, called 'hidden' or 'intimate', that is, impossible to observe (and whose conception has its origin in *theology*, which explains everything by the actions of supernatural beings). However, they retain effective causes, whose knowledge is necessary even in social sciences (I, 4; IV, 306; V, 23). Comte does not insist on natural causation, as he considers it, I think, commonly and rightly accepted. But this procedure has been interpreted by some neo-positivist and energeticist scientists (W. Ostwald and E. Mach, at the end of the 19th century) as an effective elimination of all causes (alongside that of matter, but not of energy). On the contrary, I welcome its tenacious support of Menger. Similarly, positivity requires avoiding attributing the origin of phenomena to abstract forces of imaginary entities (such as the 'phlogisticon' in chemistry), as in case of *metaphysical* philosophy. Comte, however, accepts the molecular theory as realistic, and the atomistic theory as

possible (II, 398-401), which were rejected by the same scientists even at the end of the 19th century.

Actual *laws* are 'invariable relations of succession and similarity' of phenomena, and their explanation – 'the connection established between the various particular phenomena and some general facts' (I, 5; VI, 715) therefore also as a result of an abstraction. Here we find Menger's definition of theoretical laws. Historicism interpreted the relations of similarity as specific to natural sciences, and those of succession to social sciences (their phenomena being unique). However, I would say, there are differences in any grouping of natural phenomena, as there are similarities, at least, between more or less repeatable social events in everyday life. The degree of similarity or difference depends on the nature of phenomena, on precision of observation instruments, as well as on the level of abstraction of the approach (Popovici 2016, §2.3).

Positive philosophy considers *scientific theories* as 'coordinations of observed facts' (I, p. vii; III, 438; IV, 457), but shows that theory is necessary for observation just as observation – for theory; they complement each other. The historical and current resolution of this seemingly vicious circle would take place by using, as a starting point even a wrong theory (possibly also theological), then corrected, as well as using everyday cognitions of simple phenomena. The philosopher is against the dogmatic (aprioristic, of Kantian type) elaboration of the primary principles of real knowledge, and he himself asserts, perhaps shockingly, that his system is an extension of the partial practical common sense (I, 8; VI, 718, 841). In positivism, the maximum certainty is of observed facts, not of principles and assumptions (I, 104). So that the latter can change if the facts come to contradict them.

There are, according to Comte, two kinds of knowledge: *theoretical* (looking for the laws of phenomena) and *practical* (applying various procedures to concrete objects), and engineering is placed between them; only the former are the subject of positive philosophy (I, 61, 67). On the other hand, one can distinguish 'two genres of natural [positive] sciences: some abstract, general, which have as their object the discovery of the laws that direct the various classes of phenomena, considering all the cases that can be conceived [observed]; the others – concrete, particular, descriptive... – consist in applying these laws to

the actual history of various existing objects. The former are therefore fundamental, and it is only on them that our [philosophical] studies are exercised' (I, 70; VI 13-14). Uniting these two groups, we find the three scientific orientations (historical, theoretical, practical), as well as the difference between the exact approach and the realist-empirical one, pointed by Menger.

Comte builds a *hierarchy of sciences* in an increasing order of complexity of the reality domains under study: 'this order is determined by the degree of simplicity or, what returns to the same, by the degree of generality of the phenomena, from which their successive dependence results and, consequently, the greater or lesser ease of their study'. Thus, simpler objects are parts of more complex ones (and, for example, molecules are formed by atoms, but also organisms – by means of molecules). This brings us to Menger's social 'atomism'. Thus, a first division of reality is obtained, into 'raw' (relatively simple) bodies and 'organized' (organic and social) – complex bodies (I, 87-88; VI, 789). In *Polity*, they correspond to the grouping of sciences in 'cosmology' and 'biology' (*Polity*, I, 438), detailed in *Lectures* as six fundamental sciences: mathematics with theoretical mechanics, astronomy, physics, chemistry, biology, sociology. 'The phenomena considered by the latter [science]... depend, more or less, on all the preceding ones, without exerting any influence on their [laws]' (I, 96-97). We have shown in another paper that this hierarchy had been partially anticipated by Descartes in the preface to the French edition of his book *Principles of philosophy* (Descartes [1985] 2005, p. 186; Popovici 2014d, §3.1). Let us see how the ontological-structural division of the domains of reality leads Comte to one of scientific methods and laws.

The use of *methods* is dependent on the fields of research: 'the method is not liable to be studied separately from the research in which it is used; otherwise, it is but a dead study, unable of fertilizing the spirit that exercises it'. Thus, even among the most general methods (*deduction* – corresponding to reason, *induction* – to experiment), the first is more suitable for the simplest (inorganic) domains, and the second – for the more complex (organic and social). 'The general positive method will constantly and uniformly change over the course of a certain fundamental science, and will incessantly undergo different and increasingly complicated changes, through the passage from one science to another'. Therefore, knowledge of positive methods depends on their use not

only in one science but in all sciences. Moreover, any method 'can never be learned except as spontaneously resulting from a judicious and sufficiently long exercise' (I, 39, 107-8; VI, 718-20, 761). It follows not only a critique of Kantianism but also a concordance with that *gradualism of methods*, also advocated by Menger but widely promoted and developed still by Comte for each science, as we will show below.

Induction and deduction must be accompanied in research by *hypotheses*, which in some way anticipate the result sought but they are conditioned by the possibility of factual verification, with the degree of accuracy required by the phenomenon. Therefore, 'any scientific hypothesis must refer exclusively to the laws of phenomena and never to their modes of production', that is, to that 'hidden' causes, experimentally unverifiable (II, 434, 454).

As for *laws*, also due to the increasing complexity, 'the rational study of each category [of phenomena] must be founded on the knowledge of the main laws of the preceding category and must become the foundation for the study of the next', so that the lower sciences in the hierarchy provide methods and truths for the higher ones (I, 87; III, 317). This means asserting a legal conditioning, from the base to the top of the hierarchy of the reality domains, which implicitly justifies economic determinism in society, explained by Menger. On the other hand, 'every essential order of phenomena necessarily has its own laws, apart from those that result from its actual relations to the less complicated and more general orders'. The laws of the lower domains are necessary and even dominant (in the sense that they cannot be violated) for those superior to them but not sufficient for the full explanation of the latter (VI, 714, 800). Therefore, there is an essential specificity of each level due to its increased complexity compared to the previous one, and which is manifested in the particular use of 'lower' laws (simpler, therefore easier to establish) and emergence of new, higher ones.

Taking over a fundamental distinction between *static* and *dynamic* from mechanics Comte extends it to all sciences, the presentation of objects being thus able to perform 'under two fundamental views, under the static view and under the dynamic view, that is, as being able to act and as acting effectively'. They correspond to relations of similarity, respectively of succession, of which,

we have mentioned the nature of positive laws. In chemistry, there result specific combinations and reactions, in biology – anatomy and physiology, and in sociology – social structures and historical developments, all of which, are properly studied by our philosopher (I, 33, 580; II, 398; III, 346, 475; IV, 318-24, 352, 363).

Knowledge of laws allows not only the explanation of the present and the past but also the *prediction* of future dynamics of reality. This is one of the main goals of positive sciences, namely, 'knowledge of events, independently of their direct observation and only as a result of their mutual relations' (but, like the hypothesis, it must nevertheless be verified). We find here a purpose, pointed out in a similar manner by Menger, for the theoretical orientation of sciences. The other goal is action on nature and society, also based on established laws but combined with individual and social practice. Thus, we come to a suggestive dictum of Comte: 'science, d'où prévoyance, prévoyance, d'où action' (or, more lapidary: 'savoir pour prévoir, afin de pouvoir'), hence 'knowing for predicting, aiming acting (empowering)'; and for him, action means primarily politics (I, 63; VI, 716-17, 864).

Evolution of sciences and philosophy also follows a dynamic, historical law (called by Comte the 'great fundamental law') through the passage of three great states (stages, phases) characterized by one of the predominant methods of phenomena explanation (which we mentioned above): theological, metaphysical, positive (I, 3-4; VI, 688, 701-2). The theological stage is divided, in its turn, into three sub-stages, which largely correspond to historical epochs (fetishism – prehistory, polytheism – antiquity, monotheism – Middle Ages), as the metaphysical stage corresponds to the critical Enlightenment and the revolutionary period, while positivism to the last historical epoch.

The hierarchy of complexity of sciences is also reflected in this periodization: the entry of each fundamental science in the positive stage is offset in descending order of simplicity of a specific domain (which makes it easier to find positive laws); thus, the first was astronomy, and the last – sociology. At the same historical moment, different sciences (or even parts of the same science) can stand in different stages of evolution. The 'law of the three stages', which at the beginning of the system was only a hypothesis, is verified and

proved by analysing the historical development of all sciences (I, 18; VI, 26-27, 653-55).

In the end, a mutual autonomy of positive sciences is reached (determined by the ontological differences of the levels) within the ensemble, and in exchange for the unity given by the theological or metaphysical principles, a threefold unity arises: of fundamental method – theory and empiricism, of essential purpose – prediction and action, as well as of the general evolution – from theologism to positivism (I, 55; VI, 845-6).

By its circular structure, Comte's philosophy differs radically from the pyramidal construction of 'logical empiricism' (the American metamorphosis of 'logical positivism', of the interwar Vienna Circle), in which, for rigorous sciences, observation and experience interact with empirical or defined concepts, although all must start from the primary concepts and postulates of the science.

Positivist philosophy of natural sciences: phenomena, methods, laws, and predictions

The dependence of phenomena, methods, and laws on the hierarchy of reality and science requires that all positive sciences be known but necessarily in order of their hierarchical classification (I, 109). Let us also outline this hierarchy (starting with the natural sciences) which Comte studied in the first three volumes of *Lectures* and summarized (also nuanced) in the first volume of *Polity*.

Mathematics is defined by the philosopher as the science of relations between the magnitudes of a phenomenon. It is divided into a concrete (experimental) and abstract (logical, rational) mathematics, dealing with establishing, solving the equations describing the corresponding relations, respectively. Mathematics is an 'immense accumulation of logical means [methods]', to such an extent that, for Comte, it replaces classical logic (as one can understand from the title of the first volume of his *Subjective synthesis*). However, logical-mathematical methods can only be used if certain necessary conditions are fulfilled. The generality of mathematics allows the perception of analogies between phenomena in different domains, but it cannot replace the factual and experimental foundation of each science. For more complex fields, there are

theoretical and practical difficulties in finding and solving the respective equations, and one could not hope for the mathematization of the biological and social sciences (I, 102, 129, 138-40, 147, 150-51, 541-42).

I would add that, if in Comte's time mathematics was, for most part, quantitative, it developed subsequently (in connection with the requirements of the other sciences) also as a qualitative knowledge – of the structures and invariants of phenomenal aspects (hence of their essential qualities). Thus, it became possible to mathematize even important parts of sciences of life and society. Static *mechanics* studies the equilibrium of objects, and dynamics – their laws of motion. Comte includes rational mechanics within mathematics, because its laws do not take into account conditions – a model perhaps desired by Menger for exact economic science (I, 552-53, 580; VI, 793-98).

Astronomy (static but especially dynamic) is, in Comte's view, a positive science par excellence, the first to be perfected (in a minimal manner) as its exclusive method is *observation* (without the possibility of experimentation). Its laws are only descriptive and its purpose lies in the prediction of astronomical phenomena (II, 20-29, 40, 94, 220, 231, 325-26).

Physics has as its field the laws of general properties of bodies, as long as their molecular composition and state of aggregation remain the same. Its purpose is the prediction of phenomena placed in certain conditions that do not change their nature. Here, the observation is supplemented by the *experimentation method* through correlated variation of conditions and properties, possibly under artificial (laboratory) conditions, with maximum freedom (II, 401-5, 430; VI, 800-4).

Chemistry studies the change in the properties of bodies due to change in molecular composition. In chemical reactions, 'the reciprocal action of bodies necessarily alters the nature of their properties, and it is precisely this alteration that necessarily constitutes the phenomenon' (II, 398, 401; III, 25). The possibilities for experimentation are greater in chemistry than in physics, but with more restrictions (the conditions to be fulfilled) and the experimental results must be verified by chemical and physical *analysis* and *synthesis*. The complexity and variety of results make predictions relatively uncertain, but they make necessary the methods of *comparison* and *classification* (inspired by

biology), according to internal composition and external properties (II, 406, III, 7, 27-34, 62, 68).

Biology is characterized by Comte as a 'double problem:... being given the organ or organic modification, to find the function or action, and reciprocal', and life – by metabolism. According to astatic or dynamic view, there are distinguished in organisms (hierarchically, also in order of complexity) anatomical structures of tissues, organs, and apparatus (systems), and the corresponding physiological functions, respectively. Elementary (vegetative) biological functions characterize plants, while in animals, there are added psychic features, which can control to some extent the vegetative ones, without dominating them (I, 94; III, 291, 295, 346, 368).

In biological research (both in anatomy and physiology), there could be used, in addition to observation with a naked eye, physical (with the microscope) and chemical (staining and laboratory analyses) observations. Due to complexity of organisms, experimentation through the variation of internal factors should be avoided, while the external ones should be carried out with caution. Pathological deformities and dysfunctions are, in fact, experiments spontaneously offered by nature (more expressive in higher organisms), which can be explored using the *comparison method*. This is the basis of the *classification method*, and the latter – to that of building biological *hierarchy*, as Lamarck had done (III, 317-18, 324-8, 331, 338, 344, 349, 364, 367; VI, 382).

Comte emphasizes the natural necessity of establishing a relative harmony between the organism and the environment, if the latter is not too destructive (therefore, following the law of adaptation, formulated by Lamarck); it follows a limitation from the bottom to top in the hierarchy of existence. On the other hand, organs and organic functions are in a permanent correlation (I would add, according to the law of Cuvier), which constitutes the characteristic of the stability of a biological system. Both laws replace final causes with a natural, positive explanation (III, 289, 346). Even within organisms, inorganic phenomena still obey their original laws; for example, the bone system – the laws of mechanics, and physiology, to a large extent – the chemical ones. What are changing there are the conditions under which these laws are manifested and by which the organism directs and coordinates those processes in a similar

(but more efficient) way to its action on the external environment. Thus, biology cannot be reduced to chemistry, and even less to physics (III, 274, 309, 347, 375-5, 381, 422; VI, 821-4).

Based on the relative anatomical-physiological continuity between animals and man, Comte believes that the scientific explanation of the properties of a *human individual* (but not of society) cannot be found starting from psychology, especially from the introspective one. The positive study of a man must be based on that of his biology (as to Menger the economic preferences of the individual stem from his natural needs), especially on the anatomy and functions of the brain, leaning at first on Gall's phrenological research of the late 18th century. This showed that the higher intellectual control faculties are located under the forehead, the organic (vegetative) ones – at the base of the skull (close to the spine, through which the movements of the body are conducted), and the affective ones in the middle, a positioning confirmed also by the current neurophysiology (I, 34; III, 766-9, 784, 795-7, 98-99; VI, 780, 830).

The conclusion drawn by the philosopher is that human real acts are formed through interactions of the three main faculties: intelligence, feeling, inclinations (now we would call them instincts). However (according to the fundamental bottom-up limitation of organisms), the affective faculties have, at last, the pre-eminence over the intellectual ones, and the reverse influence exists, but it is more difficult and weaker. Therefore, human freedom is bound from the inside by capacities, and from outside – by its conditions (III, 799, 804-5, 811-12; VI, 726).

Static and dynamic study of social and economic phenomena

Just as human biology of is not reducible to that of animals, neither can sociology be reduced to an individual man. 'It would be impossible to treat the collective study of the [human] species by a pure deduction from the study of the individual because social conditions, which alter the action of physiological laws, are then precisely the most essential consideration'. Theology was concerned only by the social man (asserted Comte), metaphysical philosophy – only by the individual, while positive philosophy is the synthesis of their results (therefore, in the science of society – between holism and atomism, as

Menger also pursued). The nature of man is social, because the evolution of individuals is determined, after all, by the social evolution of humanity (I, 95; III, 299; VI, 692-5).

Theology started from the idea of an 'immutable political type..., forbidding any regular modifications of the main political conceptions according to the eminently variable state of human civilization'. Later, metaphysics promoted the possibility of unlimited actions on nature and people, ignoring the dominance of the laws of the natural world over the social one, as well as the limits imposed by human biological characteristics and their restricted variability. Metaphysics also 'neglected social causes and effects', exaggerating instead the role of personalities. Positive philosophy considers that the collective action of society on the environment is an important element in the study of humanity, but even if (as we have seen) modifiability increases with complexity, it is limited by the invariability of the laws of the lower levels. Even since *Lectures*, Comte's sociology is oriented towards political action, and this character will be emphasized in *Polity* (III, 303, 401; IV, 298, 304-7, 481).

Social statics (I would say structural sociology) studies the conditions of society existence, with the interactions between the components of a social system, abstraction making of evolution (as Menger wanted by exact theoretical sciences). There is an interdependence of the components of society (culture, politics, economics, etc.), which allows it to be considered as a whole, but also a relative autonomy of them (similar, but not identical to the organs in the individual, as Menger also noted). 'Each of the many social components, ceasing to be considered in an absolute and independent way [as in the metaphysical stage], must always be conceived exclusively as relative to all the others, with which a fundamental solidarity intimately and incessantly combines it'. Unity and inner equilibrium is established spontaneously and naturally, but it does not exclude the appearance of various disequilibria and even conflicts, since the possibility of imperfections increases with complexity. The ensemble manifests itself as a whole also in relation to the influence of the environment, and Comte even believes that this behaviour could be considered as a generalization of the Galilean mechanical principle of relativity (invariance) of movements, so that: 'one can indeed always ascertain, in any system, the fundamental independence of the various reciprocal relations, active or passive, from any [external] action

perfectly common to the different parts, whatever, moreover, their sort and degree' (IV, 318, 324-25, 342-3; VI, 795).

The minimal core of society is family (even reduced to a pair) because it is not in the individual, but in it both features of sociality are found – egoism and altruism ('sympathy'). Specialization and cooperation are the essential conditions of social life for individuals, classes, and peoples. The larger and more complex the social ensemble, the more the tendencies of cooperation develop, compared to those of 'antipathy' and even sympathy, and the organization acquires a hierarchical form, necessary for the coordination and management of society (IV, 559, 597-98, 610-11).

Social dynamics (or historical sociology) seeks the laws of social *evolution*, taking into account structural changes (so that it interacts with statics). Social evolution is made from ensemble to ensemble (I would say – through a systemic solidarity). The tendency of mankind is 'to always develop, in all aspects, the whole of his life, physically, morally, and intellectually, so far as the system of conditions in which he is placed allows at that moment'. This trend leads to a continuous (long-term) progress, and dynamic sociology seeks 'the discovery of the constant laws that drive this continuity, and whose ensemble determines the fundamental path of human development' (IV, 355, 364, 366).

Static and dynamic sociology link the 'theory of existence and that of movement, the laws of order and that of progress', so they deal with the most fundamental aspects of the world as they appear in society. 'Social dynamics study the laws of succession, while social statics seek those of coexistence', so that (against the historicist and the structuralist orthodoxies) both kinds of laws are necessary for social knowledge (IV, 363, 366, 453, 591, 597-8).

The methods of sociological research are imposed by the maximum complexity of the field, and therefore by its place at the top of the hierarchy of sciences: therefore, the new science must use, on the one hand, the methods of all subordinate (but adapted) sciences, and on the other hand – those that are peculiar to it. Since the path of science is always from the known to the unknown, in sociology, it means from the whole to the part, vice versa than in the inorganic sciences. The apparent paradox is explained by the fact that, as we have shown, sociology deals with social ensembles, not individuals (left to a

subdivision of biology). The path from simple to compound is used only for gathering data, but also this is guided by theory and especially by the systemic spirit (IV, 355, 357-58, 360, 411, 422). I would add, however, that due to close connection between theory and empiricism in the positivist conception, it results in a permanent alternation between analytical and synthetic approaches (as we saw in Menger too).

Like in all sciences, due to the division of labour and specialization, in addition to direct observations, indirect ones are also accepted, that is, testimonies of other persons, possibly historical. But the increased complexity allows for more varied ways of observation than in the other sciences (here – accompanied by empathy). Direct experimentation is equivocal or even impossible, but it can be partially supplanted by disturbances or revolutions, which are spontaneous social experiments (as were the pathological cases in biology), for which a reverse induction takes place, from perturbation to law. Comparison and classification are fundamental methods in sociology (also as in biology). Here, however, the hierarchy that could result is considered by Comte as secondary, perhaps due to the weak relevance of a single criterion, in this case of maximum complexity (IV, 414, 416, 427, 429, 430-31, 434-36, 435-6).

The new method that Comte's sociology introduces into science is the *historical method*, appropriate to the long-term progressive evolution and which, according to him, would be applicable only to the study of human society (considering the succession of generations and the accumulation of changes). The philosopher said that nature, not even the living one, does not evolve, but I believe that this was not his intimate conviction (as evidenced by the *Lectures* themselves) but a concession made to his biology mentor, H. D. Blainville. 'Rational and positive history, viewed as a real science and having the set of human events in coordinated series, shows us clearly their gradual chaining'. Following the historical evolution of the components of the social system, through social series, the historical method can show both the synchronisms (parallelisms) and the lags of these developments. They are due to the systemic solidarity of the components (of which we have spoken), respectively to the differences of functions, complexity, and conditions. Too long lags risk breaking down the social system. Based on the solidarity of the system, deductions can be made from the main visible phenomena, to the secondary invisible ones.

Comte proceeds so with the law of the three stages, for which he was abusively accused of idealism. 'We must... choose here, or rather preserve, the general history of the human spirit as the natural and permanent guide of any historical study of humanity', so the most evolved indicator of development is constituted by sciences and philosophy, but taking also into account the delay of ideas with respect to the state of society. However, any indicator can be relatively masked by the solidarity with the ensemble (IV, 333, 371, 388, 450, 457-9, 461-2, 650-51).

Applying *social prediction* that these laws make possible, the tendency of human evolution is towards the preponderance of higher psychic faculties over lower instincts. This progress, however, occurs through oscillations due to lags between components (I would say – as in the Kalecki's model of business cycles (Kalecki [1933] 1966). 'The evolution of civilization does not proceed... following a straight line, but through a series of oscillations, unequal and variable,... around an average movement, which always tends to predominate, and whose exact knowledge allows the early regularization of the natural preponderance, by diminishing the oscillations and the more or less fatal hesitations that correspond to them'. Here, then, is a law of averages, similar to that which Menger used in the study of price trends. Observation over too short periods can lead to exaggeration of the importance of some disturbances, but these perturbations are only by intensity and way of application, not by nature. Therefore, 'no law of social succession [evolution]... will finally be admitted until it has been rationally attached... to the positive theory of human nature'. It is necessary to constantly verify the correlation of the parts and the concordance between the intellectual and material development of mankind (IV, 395, 406, 624-6, 652-3).

Comte argues that the study of the complexity of phenomena can and should be applied to 'all different positive modes of human activity, not only practical but also theoretical, individual or collective', including the economic subsystem of society. This one interacts both in space and time with the other components of the system, so it must be approached both statically and dynamically. Which Comte reproaches economists (except for A. Smith and, partially, for the German Historical School) is the metaphysical approach –lack of historical and structural character (of evolution and interaction with society). The path by

which a positive economic science could be founded would be the study of man's relatively one-sided dependence on nature and its consequences. 'We must indeed study in advance a natural economy to which all our conditions of existence are subordinated and which consists of phenomena essentially independent of our actions, except for the secondary changes that it determines [on these actions]' (IV, 264, 267, 272, 788). Menger will do the same with the substantiation of economic preferences.

In the second volume of his treatise on positive politics, Comte goes further in this regard and points out two related economic laws, of the possibility of production above individual needs and of the relatively long-term storage of this surplus, so that (according to A. Smith) positive (productive) labour turns out to be 'the initial source... of all material wealth'. At the same time, he points out (in their historical order) four possible ways of transmitting material goods: gift, exchange, inheritance, conquest (*Polity*, II, 150-155).

Returning to *Lectures*, the main evolution of national economies took place in the direction of industrialization: 'the industrial flourishing of modern societies was to be their first general contrast, and it is even today, from those of antiquity', but it began in agriculture and then influenced urban industry, which remained later the engine of economic and social progress. The development of public credit, united with industry, definitely installed the bankers at the top of the industrial hierarchy (IV, 28-9, 48-9, 79-80, 144-45).

I will not give the description and analysis of the total social evolution, which Comte made in the last two volumes of *Lectures* and summarized in the third volume of *Polity*. However, as he showed the influence that the sociological approach can have on all social sciences (politics, morals, science, art), we can say that the historical method of the evolution (originally thought as exclusively societal) has been extended (after the 'Darwinian revolution') to biology and geology, and even to chemistry, physics, and astronomy.

Conclusions: concordances and discordances

We have seen how Menger's and Comte's conceptions harmonize themselves in terms of the criteria and results of the typological (horizontal) and hierarchical (vertical) classifications of sciences, as well as their means and purpose. They also resemble by definition of natural and social laws, the 'gradualism of methods', the synthesis between individualism (atomism) and collectivism (holism) in social sciences, the need for autonomy but also the cooperation of all sciences (natural and social) and approaches (theoretical-abstract and historical-concrete).

On the other hand, the discordances concern mainly Menger's emphasis on the development of abstract economic theory and Comte's historical evolution of the entire society (including the economic subsystem). I think that this difference itself can be explained by the historical conditions of the two authors and by the tasks that the scientific and philosophical evolution imposed at those times: Comte had to struggle with the metaphysical approach (too abstract and absolutizing), while Menger with the historical one (excessively concrete and relativizing).

I think it can be said, after the above analysis, that a special merit of Menger is also that of extending and systematizing the positivist approach in economics, while his theory was echoed in Austria, especially through its individualist-subjective side (but not to Böhm-Bawerk). The development that the Austrian School followed is well-known. I studied in another paper the form that it took (quite different from Menger's ideas) in the philosophy of L. von Mises (Popovici 2018, pp. 116-24).

Comte's sociology and philosophy have been asserted and promoted in many fields of study and countries (of course, starting with France) during the 19th century for their objectivist and legalist approach (Gruber 1893; Scharff 2002). Both were rejuvenated after World War II by the new theories of complexity and hierarchy of levels, supported in various fields: economics (H. A. Simon and even F. A. Hayek), sociology (G. Gurvitch), psychology (J. Piaget), biology (A. Koestler, E. P. Odum, S. N. Salthe), physics (J.-P. Vigier, D. Bohm), and philosophy (N. Hartmann, M. Bunge, R. Bhaskar). I tried elsewhere to show the difficulties encountered by the philosophy of Roy Bhaskar, who attempted

to make a 'dialectical' synthesis between the causal determinism in natural sciences and the constructivist historicism in social sciences (Popovici 2014c, §2; (2), §4; 2016, §§1-2).

Endnotes

[1] English translations of the author's papers may be read and downloaded from https://romano.academia.edu/AlexandruPopovici.

Conflict of Interest Statement

The author declares no conflict of interest with any person or institution.

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