



Cell theory, economics, and the Republic in the work of François-Vincent Raspail around 1830

Ludovic Frobert

► To cite this version:

Ludovic Frobert. Cell theory, economics, and the Republic in the work of François-Vincent Raspail around 1830. *Revue d'Histoire des Sciences*, Armand Colin 2011, 63 (1), pp.27-58. 10.3917/rhs.641.0027 . halshs-00607783

HAL Id: halshs-00607783

<https://halshs.archives-ouvertes.fr/halshs-00607783>

Submitted on 23 Jun 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Théorie cellulaire, science économique et république dans l'œuvre de François-Vincent Raspail autour de 1830

Cell Theory, Economics, and the Republic in the Work of François-Vincent Raspail Around 1830

Ludovic Frobert

CNRS, UMR 5206 “Triangle, action, discours, pensée politique et économique”

ENS-Lyon, 15, parvis Descartes, 69342 Lyon Cedex 07.

Email: Ludovic.Frobert@ens-lyon.fr

Abstract

François-Vincent Raspail (1794–1878) was one of the leading Republican heroes of nineteenth-century France. His political involvement began just after the 1830 Revolution; he played a prominent role in the Société des amis du peuple, then in the Société des droits de l'homme. During the 1830s he spent many months in Louis-Philippe's jails. But Raspail was also a chemist and a physiologist who in 1833 published an important New Treatise on Organic Chemistry in which he put forward major advances in cell theory and the development of life. Simultaneously he founded a political newspaper, *Le Réformateur*, in which, in 1834–1835, he presented his plan for a general social and political reform in weekly installments. He wrote about thirteen articles “On Economic Science.” I present in this paper an analysis of this completely unknown set of articles and underline the intellectual and

conceptual transfers between chemistry, politics and economics in Raspail's thought around 1830.

Keywords: François-Vincent Raspail; cell theory; economics; Republicanism; 1830–1835.

Who could tell whether a man is a Republican because he is a partisan of cell theory, or rather a partisan of cell theory because he is a Republican?

—Georges Canguilhem, *La théorie cellulaire* (1945), in G. Canguilhem *La Connaissance de la vie* (Paris: Vrin, 1989 [8th edn.], 48).

From induction to induction, we have come to the last subdivision of governmental administration, the commune, just as, by analysis, we arrive at the integrative molecule, the final expression of the whole of which it is a part. It is in the commune that we should organize the economy, ground the social system, and concern ourselves with the application of our theories on the progressive improvement of the human race.

—François-Vincent Raspail, *Le Réformateur*, no. 151, March 12, 1835.

In a classic article first published in 1945, Georges Canguilhem examined the first stages of modern cell theory. Drawing in particular on the pioneering work by Marc Klein (1936), he stressed that the sanctioned history of that theory did not go right back to Robert Hook's *Micrographia* (1665) but rather stemmed from a whole set of innovations that had proliferated between the very end of the nineteenth century and the 1840s. Rejecting any positivistic reading, Canguilhem emphasized that empirical and theoretical progress did not give a full account of the history of interest in the topic, and described the cell as a “biological object of considerable and incontestable

affective overdetermination.”¹ Developing his point of view, he emphasized above all the exchanges, transfers and borrowings that had taken place at that time between the domain of living organisms and that of society and had enabled this biological object to be constructed. In the decades leading up to the 1840s, several models of social organization competed to accompany, feed into and be fed by the beginnings of cell theory. At the heart of the debates was the understanding of the relationship between the whole and its parts. Whereas with Buffon an atomistic model predominated, the Romantic reaction in Germany, that of the philosophers of nature, led to a community model being privileged.² In France, late in the nineteenth century, Xavier Bichat’s inaugural warnings against the atomistic model still held sway, leading tissue to be privileged over the cell. According to Canguilhem, the situation did not really change until the middle of the century, with Claude Bernard. Drawing on the rapid advances in embryology and physiology, and benefiting from the first classic state of cell theory established by the German scientists Matthias Schleiden, Theodor Schwann and Rudolf Virchow, Claude Bernard imposed an economic and political model of the living in which the relationship between the part and the whole is one of integration:

The structure of the organism reflects the exigencies of life on a more basic level, that of the cell. The cell itself is an organism, either a distinct individual or a constituent of a larger “society” of cells forming an animal or plant. [. . .] Complex organisms were now thought of as totalities comprising virtually autonomous subordinate elements. [. . .]. Division of labor was the law for organisms as well as for societies. [. . .]. [C]onceived in terms of an economic and political model [. . .], an organism was a

¹ G. Canguilhem, “La théorie cellulaire” [1945], in *La Connaissance de la vie* (Paris: Vrin, 1989 [8th edn.]), 48. (*Knowledge of Life*, translated by S. Geroulanis and D. Ginsburg, [New York: Fordham University Press, 2008], 30).

² Klein observes, for example, that the thoughts on the living of an author such as Lorenz Oken “conceive the organism as a fusion of primitive beings, each element of which has lost its individuality in favor of a higher unit, the organism” (M. Klein, *Histoire des origines de la théorie cellulaire* [Paris: Hermann et Cie, 1936], 19).

set of structures that grew increasingly complex as they assumed responsibility for originally undifferentiated functions.³

The role of Claude Bernard is indisputable, but authors such as Klein, and more recently François Duchesneau (1987) and Henry Harris (2000),⁴ have pointed to the presence of considerable thinking in the field of cell theory from the early years of the Restoration. It was indeed in those years⁵ of political turmoil leading up to the July Revolution that scientists such as Henry Dutrochet, François-Vincent Raspail or Pierre Turpin put forward a genuine heuristics in this area. The economic and political model of the living already appears to inspire some of these scientists: Klein observes for example that, for Turpin, “the cell leads an individual life and it is the sum of these private lives that constitutes the total life of the organism [. . .]. The organism is nothing other than a cellular State or a federation.”⁶ Raspail’s work nonetheless raises even more clearly the question of the reciprocal exchanges between the register of the living and that of the social—both economic and political.

Raspail’s⁷ name is generally associated with that of Auguste Blanqui to sum up fifty years of subterranean Republican activity preceding the establishment and then the

³ Georges Canguilhem, *Études d’histoire et de philosophie des sciences* (Paris: Vrin [5th edn.], 1995), 329 (*A Vital Rationalist: Selected Writings from Georges Canguilhem*, ed. F. Delaporte, trans. Arthur Goldhammer, [New York: Zone Books, 2000], 299). Again emphasizing that in this economic and political model, the organs only exist to support the life of the cells, Canguilhem goes on to say: “By joining in association, and instituting a kind of society, the basic elements obtain the collective means to live their separate lives [. . .]. The part depends on a whole that exists solely in order to maintain it. By referring all functions to the cell level, general physiology provided an explanation for the fact that the structure of the whole organism is subordinate to the functions of each part. Made *of* cells, the organism is also made *for* cells, for parts that are themselves less complicated parts [. . .]. [T]he whole was no longer a structure of interrelated organs but a totalization of individuals” (Canguilhem, *Études*, 330–1 [*Vital Rationalist*, 299–300]).

⁴ F. Duchesneau, *Genèse de la théorie cellulaire* (Paris: J. Vrin / Montreal: Bellarmin, 1987); H. Harris, *The Birth of the Cell* (New Haven, CT: Yale University Press, 2000).

⁵ i.e., 1814–1830 (translator).

⁶ Klein, *Histoire des origines*, 31–32.

⁷ On Raspail’s biography, see: Georges Duveau, *Raspail* (Paris: PUF, 1948); Dora Weiner, *Raspail 1794–1878: Scientist and Reformer* (New York: Columbia University Press, 1968); Daniel Ligou, “Preface,” in François-Vincent Raspail, *François-Vincent Raspail ou Le bon usage de la prison* (Paris: J. Martineau, 1968); Isabelle

slow stabilization of that form of government in France in the last quarter of the nineteenth century; Raspail truly inaugurated his commitment directly after the July Revolution, taking the leadership of the *Société des amis du peuple* (Society of the Friends of the People), which led to his first conviction and jail sentence. In the early 1830s he spent some forty months in the jails of the Orleanist regime, an experience that provided the material for his famous *Lettres sur les Prisons de Paris* (Letters on the Prisons of Paris) (1839). Raspail's name is still mentioned for his pioneering contribution to social medicine, medicine for the people, and reference is made in this regard to the phenomenal success of his *Manuel annuaire de la santé, ou médecine et pharmacie domestiques* (Annual Handbook of Health, or Domestic Medicine and Pharmacy), published from 1845 to 1879 and translated into Italian, English, German, Spanish, Portuguese, Dutch, etc. His work as a scientist is less often discussed. But we know that his *Nouveau système de chimie organique* (New System of Organic Chemistry) (1833 [1838]), praised by Étienne Geoffroy Saint-Hilaire and, it seems, curiously ignored by the German pioneers of cell theory, synthesized ten years' research and was followed by the *Nouveau système de physiologie végétale et de botanique* (New System of Plant Physiology and Botany) (1837) and finally by the publication of his *Histoire naturelle de la santé et de la maladie chez les végétaux et chez les animaux en général et en particulier chez l'homme* (Natural History of Health and Sickness in Plants and Animals in General and Especially in Man) (1843). But it has passed completely unnoticed that—at the very time when he was completing the first synthesis of his research in “organic chemistry” or “microscopic chemistry” and when, simultaneously, he was asserting his Republican political ethos—he would set out, for a wide readership, his plan for “social reform,” of which political economy constituted a major dimension. It was between October 1834 and April 1835—in the newspaper *Le Réformateur*, set up and “made to measure” for him by his friend Pierre Guillard de Kersausie—that Raspail presented his plan, spoke of the “development” to be promoted through a whole

Backouche, “Raspail,” in *Dictionnaire critique de la République*, ed. V. Duclert and C. Prochasson (Paris: Flammarion, 2002); Patricia Bédeř and Jean-Pierre Bédeř, *François-Vincent Raspail: Savant et républicain rebelle* (Paris: Alvik Éd., 2005).

series of “reforms,” a “newly organized hive,”⁸ and signed some thirty articles entitled “On Economic Science.”

A study of this series of articles, a major component of Raspail’s plan for “social reform” is interesting in several respects. First, it sheds light on an unexplored episode in the scientific biography of a major but in fact little studied intellectual figure of nineteenth-century France. Then, as a case study, it can constitute an illustration of the transfers that took place from the earliest stages of several developing sciences: chemistry, physiology, and economics. Analysis of the articles that Raspail devoted to “economic science” can, finally, enable a better understanding of the “social” turn then taken by some, relatively minority, currents of Republicanism in France. In a first stage, I shall consider Raspail’s “organic chemistry” so as to set out some of its general outlines; in a second stage, I shall examine his political economy. I identify some features in his economics *analogous* to those in his organic chemistry; but I also show how his singular intellectual equation prevented him from too crudely identifying biological organization with social organization—for, as Canguilhem again points out, while organization, in its most general sense, concerns the conversion of competition into compatibility, “for the organism, organization is a problem solved; for society, organization is a problem to be solved.”⁹

Vital Chemistry and Cell Structure

A “creative spark that radiates by subdividing, through countless, endless dichotomies”—the formulation is found in the “Preliminary Notions” of the second edition (1838) of the *Nouveau système de chimie organique*.¹⁰ It sums up Raspail’s

⁸ François Raspail, “Science économique,” *Le Réformateur*, article of 26 March 1835. In 1872, Raspail republished his articles from *Le Réformateur* in a collection, *Réformes sociales*. The section entitled “De la science économique” makes up the major part of it, with twenty-eight articles, initially published between January and March 1835; three recapitulatory articles published on April 25, 26, and 27 are reproduced in the 1872 edition. At the end of this paper is a summary bibliography of the works of Raspail cited in this text; in the notes that follow, the short references refer to that bibliography.

⁹ “[P]our l’organisme, l’organisation est son fait; pour la société, c’est son affaire,” Canguilhem, *Études* 333.

¹⁰ Raspail, *Nouveau système de chimie organique*. (Paris: Baillière [2nd edition], 1838), 5.

system. The “creative spark” evokes what will be called, as a convention, a “vital force,” singular and irreducible to the realm of the inorganic, a force that can only be analyzed through approximation, and found at the heart of the living; that being so, starting from an elementary unit, the cell,¹¹ which will split itself *ad infinitum*, a whole plan of development unfolds, again springing from original combinations, bringing physical and chemical processes into play. Time is essential here, and it is an oriented, rhythmically ordered process that animates the living in an endless exchange with its environment. Three aspects of Raspail’s program merit discussion here: his reflection on the nature of life, his point of view on the knowledge of life, and finally the culmination of this program in a reflection on Man.

Reflection on Life

While he was indisputably a pioneer¹² and an autodidact, it is nonetheless appropriate here to reconnect Raspail’s work briefly with his milieu. His main scientific contributions appeared between 1824 and 1830; thereafter, his attention and efforts were more taken up by journalism and politics, and in extending public knowledge of science, particularly of medicine. The period starts with a dissertation on “The Formation of the Embryo in Graminaceae” (“Sur la formation de l’embryon dans les graminées”), presented to the *Académie des sciences* in November 1824 and published the following year in the *Annales des sciences naturelles*. This was followed by research in which, starting out from results concerning “vegetable tissues,” he gradually extended his conclusions to “animal tissues.” The period ends with the publication of his *Essai de chimie microscopique* (1830) and above all his *Nouveau système de chimie organique*.

¹¹ For the presentation of Raspail’s cell theory I draw on the contributions of Jean Bernhardt “L’œuvre scientifique de François Raspail,” in *Catalogue de l’exposition Raspail* (Carpentras: Bibliothèque Inguimbertaine, 1978); François Duchesneau, *Genèse*; and Bernardino Fantini, “Raspail et la théorie cellulaire,” in *La Médecine du peuple de Tissot à Raspail*, ed. D. Teysseire (Créteil: Archives départementales, 1995).

¹² The phrase is from Jean Bernhardt (“L’œuvre scientifique”). All modern commentators stress that Raspail then presents a possible theory of the cell, which anticipates many later advances (especially in histology) but does not identify the nucleus or foresee the principle of the cell division.

The influence of two milieux is clear. On the one hand, his research draws on the dynamics that drive the works of the French botanists.¹³ Although regarded as one of the less “noble” branches of the natural sciences of the time, was then making rapid strides on the questions of, on the one hand, the fundamental individuality of the living, and on the other hand, of the metamorphosis or development of vegetable life and more generally of all forms of life. It is very possible that Goethe’s *Naturphilosophie* influenced this field of research, but above all this was an area dominated by the research of Louis-Marie Aubert du Petit-Thouars, and, even more, of his successors, by the advances of the Genevan botanist Augustin-Pyrame de Candolle, or the early explorations of Charles-François Brisseau de Mirbel, which made the cell the basic element of vegetable organisms.¹⁴ On the other hand, Raspail presented his initial research just at the time when the first volumes of the *Dictionnaire classique d’histoire naturelle*, edited by Bory de Saint-Vincent, were being published and when Geoffroy Saint-Hilaire was in his turn converting to a theory of transformism, putting forward a new synthesis¹⁵ and ever more overtly and polemically contesting Georges Cuvier’s fixism. The battle here was as much ideological as scientific¹⁶ and, in this context, Raspail entirely shared Geoffroy’s arguments, which he defended both in the *Bulletin universel des sciences et de l’industrie* (1825–1826) and in the *Annales des sciences d’observation* (1829–

¹³ It is worth noting that Aubert du Petit Thouars was one of the few Academicians, along with Geoffroy Saint-Hilaire, who encouraged Raspail in 1824

¹⁴ Georgette Légée, “Essais sur l’organisation des plantes par A. Aubert du Petit-Thouars,” *Revue d’histoire des sciences* 27, no. 3 (1974): 241–249; Michel Guédès, “La théorie de la métamorphose en morphologie végétale,” *Revue d’histoire des sciences*, 22, no. 4 (1969): 323–363 and 25, no. 3 (1972): 253–270; Gabriel Gohau, “Précurseurs français de la théorie cellulaire en botanique: De Mirbel (1809) à Mirbel (1839),” *Actes du 97^e congrès national des sociétés savantes, 1972*, v. 1 (Paris: Bibliothèque nationale, 1977), 337–350; Olivier Perru, “Zoonites et unité organique: Les origines d’une lecture spécifique du vivant chez Alfred Moquin-Tandon (1804–1863) et Antoine Dugès (1797–1838),” *History and Philosophy of the Life Sciences* 22 (2000): 249–272; Perru, “L’unité dynamique du végétal: Du Petit Thouars (1758–1831),” *N. T. M.* 11 (2003): 13–28; Stéphane Schmitt, *Histoire d’une question anatomique: La répétition des parties* (Paris: Publications scientifiques du Muséum national d’histoire naturelle, 2004).

¹⁵ Corsi, P. 2001. *Lamarck: Genèse et enjeux du transformisme 1770–1830* (Paris: CNRS Éd., 2001).

¹⁶ Toby Appel, *The Cuvier-Geoffroy debate: French Biology in the Decades before Darwin* (Oxford: Oxford University Press, 1987).

1830).¹⁷ Raspail's commitment to transformism and his defense of Geoffroy cannot, however, be entirely explained by political or ideological motives. Beyond those, his immediate solidarity with Geoffroy, who, as Pietro Corsi for example has emphasized, presented a critical selection as much as a synthesis of the arguments of Jean-Baptiste Lamarck, Raspail was directly reconnecting with the classic transformist lineage, that of Buffon and Lamarck, whose two central hypotheses he shared:¹⁸ first, rejecting the "mechanical philosophy" of the living but also any animist orientation, Lamarck conceived life as an effect of organization, a singular "aggregation" of matter. This materialism enabled him to unify the realm of the organic—vegetable and animal—and genuinely establish the study of life, biology, and lay out its main branches. Secondly, Lamarck placed time at the heart of the living, presenting a theory of evolution that envisaged an unequal distribution of living beings on a scale running from the simple to the complex and accounted for this inequality by the "instructive" role of the environment. This kernel of hypothesis is the basis of Raspail's approach, which, as will be seen, also shares, but reworks, a number of auxiliary hypotheses from Lamarck's program: this is evidenced, among other things, in his self-definition as a naturalist philosopher, his frequent use of the idea of analogs, or his psychophysiology. Raspail does not, however, simply enroll himself in this program; he extends it by choosing to localize and pursue the study at the cellular level.

In his *Nouveau système de chimie organique*, Raspail starts out from the distinction between the realm of the organic and that of the inorganic, and underlines the generality of the realm of the organic by defending the thesis of a fundamental identity of all realms of the living, both vegetable and animal; and, as he clearly states, "nature, in all its varieties, proceeds from "a single cause of varied

¹⁷ Weiner, *Raspail*, Ch. III. Pietro Corsi has pointed out that these publications were then the main bastions of resistance to Cuvier's official fixism and, above all, channels for critical diffusion of Lamarck's ideas (Corsi, *Lamarck*, 304–306).

¹⁸ On this program, see Goulven Laurent, ed., *Lamarck (1744–1829)* (Paris: Éd. du CTHS, 1997) and *La Naissance du transformisme* (Paris: Vuibert, 2001); Giulio Barsanti, "Lamarck et la naissance de la biologie," in Laurent, *Lamarck*; Corsi, *Lamarck*; Jacques Roger, "Chimie et biologie: Des 'molécules organiques' de Buffon à la 'physico-chimie' de Lamarck"; and Laurent, "Lamarck et la biologie," in J. Roger, *Pour une histoire des sciences à part entière* (Paris: Albin Michel, 1995).

combinations”; or again, “nature has formulated animals and vegetables in accordance with the same essential type.”¹⁹ All previous explanatory systems, generally supporting a technological or mechanical model of the living, have failed to reckon with the “vital force” that is at the heart of organized beings. Raspail believes that it is possible to approximate this unknown vital force by discovering the elementary chemical elements and combinations at the origin of the living and taking account of the fact that these combinations reveal a singular process of organized development.

The cell, or what Raspail named the “vesicle,” constitutes the first element of the living: “The type of organized being may be reduced, in its simplest expression, to an imperforate vesicle, possessing the property of elaborating, for its indefinite development, the gaseous and liquid substances that it draws into itself, by aspiration, and throwing off, by expiration, the decomposed elements that cannot be assimilated.”²⁰ Raspail uses the term “laboratory cell” and can even say that the cell constitutes “a center of vitality, a laboratory in which new quantities of gases are organized, by successively associating and condensing them.”²¹ Here it is indeed the exchange between the living and its environment that it is at the heart of development: “I can conceive that all the effects of the organization and development of the organs are due to the property the organic vesicle has of aspirating gases and liquids, condensing the gases with the liquids within itself, assimilating the products, by attraction, and ejecting or expiring, by repulsion, the non-assimilable products that cannot serve for assimilation.”²² The multiple combinations of these elementary vesicles then make it possible to envisage all the forms of the living and, taking up an expression he had used as early as 1827, Raspail can exclaim: “Give me a vesicle within which other vesicles can develop and infiltrate, and I will give you the organized world.”²³ This chemical process is, however, singular and cannot be compared to the combinations of the inorganic realm: “The organic molecule indeed

¹⁹ Raspail, *Nouveau système de chimie organique* (Paris: Baillière, 1833), 31, 546.

²⁰ Raspail, 1833, *Nouveau système*, 77.

²¹ Raspail, 1833, *Nouveau système*, 78.

²² Raspail, 1833, *Nouveau système*, 80.

²³ Raspail, 1833, *Nouveau système*, 547.

results from a chemical combination of known inorganic elements; but this kind of combination is such that it alone gives birth to a new class of phenomena, and constitutes a realm apart. So the foundations of the chemical theory of organized beings are not to be sought in the inorganic realm but in the organization itself.”²⁴ This organization has three particularities: first, as we have seen, the cell functions on the basis of an exchange—inspiration then expiration—with its environment; secondly, every cell is born from another cell; thirdly, the combination of cells, which Raspail calls “vesicular crystallization,” follows a regulated succession: “The mere idea of succession or development leads us to conclude that, if one examines the products at a certain time, one will find them chemically more or less heterogeneous and more or less mixed.”

Ten years later, in the prolegomena to his *Histoire naturelle de la santé et de la maladie*, he was able to further simplify these various propositions, restating that the vesicle is “the type of the general organ that we call individual,” that it “develops by reproducing its type; it grows by engendering; its development is but an infinite series of generations,” but on condition that it benefits from a favorable environment, and that, in summary:

The organized cell is but a mold, a matrix capable of combining the materials of the earth and the air, in other, equally organized matrices. Find me the law of association of water and carbon with the earthy bases, and you will have found the law of organized life, the laboratory of organization. Then find the laws that govern the various combinations of these elements capable of entering into the combination of an organized cell, and you will have produced at the same time the various results of animal or vegetable development.²⁵

²⁴ Raspail, 1833, *Nouveau système*, 77.

²⁵ Raspail, *Histoire naturelle de la santé et de la maladie chez les végétaux et chez les animaux en général et en particulier chez l'homme* (Paris: A. Levavasseur, 1843), 10–11, 23. As Bernardino Fantini rightly emphasizes, “The cell is theoretically fundamental in his system, since it is prospectively the site of unification between chemistry and morphology, but it is at the same the physiological unit and the structural unit of living organisms” (Fantini, “Raspail et la théorie cellulaire,” 86–87).

The Philosophy of Life

If, in 1809, Lamarck entitled his major work *Philosophie zoologique* and a decade later Geoffroy Saint-Hilaire entitled his own *Philosophie anatomique*, this is because both of them, following in the line of the Idéologues, saw themselves as “naturalist philosophers” (Lamarck). Here too Raspail situated himself strictly in this lineage, regarding any philosophy independent of the natural sciences as meaningless; but considering equally useless any knowledge that limits itself to being strictly factual and does not seek to rise to more theoretical and more general considerations. The singular properties that Raspail observed in the living—complexity, organization, evolution—then led him to put forward several methodological options. Three of them deserve mention here.

Raspail insists on the conjectural and evolving character of all knowledge. Some disciplines, chemistry since Antoine-Laurent de Lavoisier for example, have accumulated sufficient positive knowledge to develop a genuine system; the science of vegetable and animal beings is as yet less solid but has succeeded in establishing a classification. By contrast, organic or vital chemistry is not yet able to develop either a system or a classification; this is shown by the difficulty it has in establishing a first solid distinction between the vegetable realm and the animal realm. In this context, Raspail recalls the provisional and heuristic character of theory:

A theory is a general formula capable of being applied, with as few exceptions as possible, to all the facts of a certain order observed by experience; it is a way of conceiving the relations among the phenomena, their filiation or their analogy; it is the real or hypothetical expression of a law, whose existence is recognized, although it is often not possible to specify its elements. A theory is therefore not invariable; and the best one is not the one that no longer needs to change, but the one that suffices for our present knowledge; we have examples of two theories which explained a certain order of phenomena with equal success. However, it should be observed that a theory always has some truth in it; that, as a consequence, despite its hypothetical form, it can serve as a useful guide in the course of observation.²⁶

²⁶ Raspail, 1833, *Nouveau système*, 76.

The irreducibility of the living may, as a convention, be associated with the existence of a “vital force” that is at present unknowable: “Does it matter to me,” Raspail observes, “that you replace the name *vital force* with that ‘chemical property,’ if you are forced to admit that this has no identifiable relation with the chemical properties of the non-organized?”²⁷ This force must then be posited as a simple unknown. When this unknown is supposed, the science of the living will advance through the closest possible knowledge of the physico-chemical phenomena at work in the living. Several corollaries are drawn from this proposition: first, knowledge of the living must accept all the complementarities between the sciences recent advances have brought to light; this knowledge of the living must therefore be supported by and must mobilize all the more consolidated sciences, which precede it in the general classification of the sciences; only on this condition will the specificities of the living be apprehended. “Nature is neither a chemist, nor a botanist, nor a zoologist, nor a mineralogist, nor a physiologist; it is in no way divided into scientific compartments; it does not proceed through classification and artificial systems; it is a single cause of varied combinations.”²⁸ To untangle the “mystery of life,” to arrive here too at a classification and a system, it is necessary—and this is the second corollary—to develop a “new method of observation, applied to the study of organized beings.”²⁹ This method is characterized by its concern to bring the study to a microscopic level with a view to identifying some analogies, at the level of the different genera and species, that point to the single plan at the origin of the living. Here the numerous innovations that Raspail brought into the use of the microscope come into play. From Marie-François-Xavier Bichat to Henri Ducrotay de Blainville and then Auguste Comte, the use of the microscope was deprecated. But Raspail thinks that these objections only concern the misuse of that essential tool; here, recalling that one should “no longer be sometimes a chemist, sometimes a botanist, sometimes a physiologist, and sometimes a physicist, but all these at once and in all circumstances,”³⁰ Raspail sets out his plan of battle:

²⁷ Raspail, 1833, *Nouveau système*, 79.

²⁸ Raspail, 1833, *Nouveau système*, 31.

²⁹ Raspail, 1833, *Nouveau système*, 32.

³⁰ Raspail, 1833, *Nouveau système*, 37.

Nature having deposited certain substances in certain organs, I shall demand of anatomy the means of recognizing these organs, and as soon as I shall have learned to distinguish them in all their varieties of form, I shall call on chemistry to aid me with her processes and reagents. If these organs are too small to be properly studied with the naked eye, I shall invoke the assistance of the microscope. Optics will teach me to follow the course of luminous rays, and enable me to appreciate the effects of reflected or refracted light; and I shall transport my chemical laboratory to the object-glass of my microscope.³¹

Raspail finally insists on the public character of science; this directly inspires all his efforts to diffuse, share and, in return, enrich knowledge. His endeavors to popularize science started in 1832, with his *Cours élémentaire d'agriculture et d'économie rurale*, and were then generalized, becoming most extensive some years later in the area of hygiene and medicine. On many occasions, and incidentally echoing some of the tones of Geoffroy Saint-Hilaire in his polemic against Cuvier, Raspail locates knowledge in the public—but also in a generation of critical and recalcitrant “young minds”³²—and not in constituted, rigid, academic bodies. He describes, in his radical style, a context in which science is not cut off from its public.³³ Reversing the official credo, he even writes: “*Pace* the accredited scientists, it is the ignorant who are right.”³⁴ It is true, he explains, that in the controversy over transformism, Cuvier and his epigones had set a bad example, truncating and falsifying the debate against all the “rules of polemic.” It is a compartmentalized academic milieu, in which exchanges and adaptations do not exist and the rule is immobilism, that Raspail denounces: “When considering this multitude of frameworks that our institutions have devised for the various scientific professions, this infinite number of scattered objectives in the domain of understanding that the

³¹ Raspail, 1833, *Nouveau système*, 31.

³² See here the first memoir, on the Cuvier–Geoffroy Saint-Hilaire controversy, in his work *Nouveaux coups de fouet scientifiques* (Paris: Meilhac, 1831), 7.

³³ Bernadette Bensaude-Vincent, “A genealogy of the increasing gap between science and the public,” *Public Understanding of Science* 10 (2002): 99–113.

³⁴ Raspail, 1838, *Nouveau système*, 33.

countless rivalries aim to achieve, one would be tempted to think that nature is less a unity than a kind of mosaic, each compartment of which contains a law, and of which each law engenders a new realm with no other relation to the neighboring realm than a point of contact in space.”³⁵ Raspail’s critique is also sociological: the scientific academic world reproduces the aberrations of a new aristocracy of money allied with the monarchy. For, if these academic compartments exist, “this is mainly because these various compartments are professions, these professions are occupations, and intrusions into them are akin to plundering and violations of property,” thus giving “science the appearance of a vast budget.”³⁶ It is not this narrowly economic or proprietary model that Raspail has in mind to give life and therefore movement³⁷ to science, but the model of the jury, the competent community in perpetual communication.

Mechanisms of Thought and Rules of the Will in Man

The study of the living truly culminates with the most complex of its realms, that of Man. Here too, Raspail places himself in the line of Lamarck and Geoffroy Saint-Hilaire in rejecting spiritualism and putting forward a psychophysiology that aims to establish the material bases of psychic phenomena.³⁸ Starting with his *Nouveau système de chimie organique*, Raspail thus rounds off his reflection on the living with an extension to the domain of Man and society. Traces of this are found in the part devoted to the “Combination of Thought” and in the concluding “Physiological Summary.”

The of thought must be taken away from the “psychologists” (the spiritualists) and undergo a “positive” study, comparable, par analogy, to the study of the living

³⁵ Raspail, 1838, *Nouveau système*, 2.

³⁶ Raspail, 1838, *Nouveau système*, 5.

³⁷ “To live is to develop; to die is to have reached, either naturally or artificially, the end of development [. . .]. Health is the exercise of this development; sickness is its disturbance; death is its cessation [. . .]. All rest is death” (Raspail, 1843, *Histoire naturelle*, 33).

³⁸ Ludmilla Jordanova, “La psychologie naturaliste et le ‘problème des niveaux’: la notion de sentiment intérieur chez Lamarck,” in *Lamarck et son temps, Lamarck et notre temps*, ed. D. Boulanger (Paris: J. Vrin, 1981), 69–80.

through physico-chemical processes: “I cannot think without a brain; by what mechanism, do I think with my brain?” is Raspail’s question. Here, it is the will that is at the heart of the mechanism. The will, by analogy, is assimilated to a transformative power following an exchange between a manifestation of the living (thought) and its environment. For the will comes down to an atomic combination (again he proceeds from an elementary unit) between “external perception” (or “impression”) and “internal propensity” (or “instinctive inclination”). As a general rule, there is an “affinity” or “attraction” between the two, which means, in short, that adaptation takes place harmoniously. Since the will reproduces itself rapidly through acts, there is indirect adaptation to the environment through the assertion of needs, habits, new characteristics. “The *propensity* that predominates even in uncivilized Man is *sociability*,”³⁹ writes Raspail, who is overtly hostile to the utilitarian formula. This propensity specific to Man indeed diminishes as one goes down the scale of the living. The development of this propensity depends however on a successful adaptation to the environment, and therefore, foremost on a favorable environment; here, the environment is “any kind of a society.” The role of this environment is to enable, or rather, to favor, the natural propensity to sociability: “In the social order *wickedness* is an anomaly; for *sociability* is the normal propensity.”⁴⁰ And it is the role of the institutions to favor this propensity and then to facilitate the growth of a will making possible, through the reproduction of certain acts, the acquisition of new habits and beliefs, adapting Man optimally to his environment. But Raspail would also soon insist—and we see here the first trace of a specific reflection on Man and society—on the possibility that, for the fulfillment of this sociability, Man may modify and shape his environment; in 1843, he stressed, for example, the great variety of “artificial means [that] may greatly modify the environment in which we live.”

“Health is our normal state,”⁴¹ Raspail declares. His cell theory implies a clearly Lamarckian, non-Darwinian model of development, without struggle, ruthless selection or elimination of the weak. His vision privileges a teleological model of

³⁹ Raspail, 1833, *Nouveau système*, 229.

⁴⁰ Raspail, 1833, *Nouveau système*, 230.

⁴¹ Raspail, 1843, *Histoire naturelle*, 5.

evolution moving from an elementary unit, through natural, fraternal composition, to larger, more structured units, more capable of adapting to their environment. In this context, sickness is an error, arising from the intrusion of disruptive germs that stop development; the goal of all living things is then first to benefit from a favorable, nurturing environment; here Man enjoys an additional power, that of shaping this environment.

Organizing the Association of the *Commune*

Raspail was certainly one of the foremost actors of the Republican movement at the start of the July monarchy. For a time chairman of the *Association des amis du peuple*, then of the *Association républicaine pour la liberté de la presse patriote*, and finally a leading figure in one the two committees of the *Société des droits de l'homme*, he embodied moderate Republicanism.⁴² But “moderate” did not mean “tepid”: for Raspail, before turning to external questions (the emerging nationalities) or constitutional problems, Republicans should acknowledge the scandalous character of the present; in a context dominated by the rhetoric of progress, one could not fail to see the new social fractures and observe that nine tenths of the laboring population lived in a state of extreme precarity. In a new industrial world full of objective promises, this situation was therefore abnormal. Republicans should, then, attend to the crucial question of “social improvement,” which could only be achieved by means of reform, the ultimate guarantor of the “the happiness of all.”⁴³

Raspail presented his first considerations on political economy in his defense in the “trial of the fifteen” (early 1832), then in the *Cours élémentaire d'agriculture et d'économie rurale* which he wrote during his second imprisonment. These ideas were taken up again, extended and systematized a little later, in the series of articles he published in 1834–1835 in *Le Réformateur*. He considers that economic inquiry is analogous to that carried out in organic chemistry: economics is a science of observation; it must identify its elementary unit, the equivalent, in the social sphere

⁴² Gabriel Perreux, *Au temps des sociétés secrètes: La propagande républicaine au début de la monarchie de Juillet (1830–1835)* (Paris: Hachette, 1931).

⁴³ *Le Réformateur*, Prospectus, October 8, 1834.

of the “laboratory cell” in biology; it must also detail the various possible combinations of these elementary units and, to do so, must work out the law of composition specific to the units of the social; finally it must reflect on the adaptation of the social to its environment.

Economics, a Science of Observation

Economic science, according to Raspail, occupies a cardinal place in the study of a specific realm of nature—the social. On many occasions, in his articles in *Le Réformateur*, he insists on the priority of this investigation: “We leave politics to others and concern ourselves with economic science; that is the first part of our mission; social reform is the second.”⁴⁴ The aim of political economy is to secure “the happiness of all.” In this sense, economics is a simple science: “Clarity and precision are the only two graces to which a demonstration of social economy is dedicated,”⁴⁵ he declares, for example. Simplicity is not synonymous here with immediacy: the aim, “the happiness of all,” is not very difficult to define concretely, the means to achieve it are not beyond human reach, but an effort of inquiry and then publicity is here. So Raspail emphasizes here that the science of economics must, in order to meet the challenge, first aim for an original analysis and synthesis, secondly, draw on the findings of older disciplines and, thirdly, devise a mode of observation that is appropriate to its object.

He therefore believes that economics cannot be limited to a simple empirical knowledge. On the one hand, broad and ambitious reflection is required, breaking down the barriers between academic departments of knowledge. The first priority for “general reform” lies in the economic domain and the general science of the social will be built up from the materials of economics. Old habits in reflection on society must be abandoned. The old political corpus must be set aside in favor of a renewed, broad reflection that makes it possible to understand a world in which politics “will be generalized through its contact with all the vital questions of the great reform that we call for. It will become moral, industrial, agricultural, literary and scientific; for

⁴⁴ Raspail, in *Le Réformateur*, April 25, 1835.

⁴⁵ Raspail, *Réformes sociales* (Paris: chez l’éditeur de M. Raspail, 1872), 209.

politics is the art of governing a society that lives from all these things; in a word, politics, for us, will be nothing other than the social economy in its generalities and in its everyday applications.”⁴⁶ On the other hand, it should also not be forgotten that every synthesis proceeds from an analysis that provides the key to the rules of composition and transformation; economics is simple, elementary, because it essentially poses a problem of administration. “How then,” Raspail asks, “does the art of administering a State differ from the art of administering a house?”⁴⁷ Again, one has to start from the cellular activity. To administer means drawing up simple accounts—“surveying, consumption, production,” and then establishing the “balance.” The most rigorous administration—because it is the most direct and best informed—is found at the microscopic level, and Raspail had already offered an illustration of this in his *Cours élémentaire d’agriculture et d’économie rurale*, where he foresaw the farmer properly educated, intelligent and active, a unit that “protects, coordinates, prepares, and uses”: “With these two qualities, not an atom in the farm remains sterile or can be regarded as waste. For, in nature everything is done by combination and decomposition; by combining and decomposing, Man therefore can, in his turn, rival nature. And what can one not combine or decompose, by means of study and experiment?”⁴⁸

As a science of observation, economics must, secondly, be able to draw on the findings of the sciences that precede it, in particular organic chemistry. The latter will provide, for example, the rules enabling it to transform—and therefore best adapt itself to—its natural environment, by modifying land, animals and plants. But, as the general study of the social, economics must above all proceed from the findings of physiology and of what the study of the living has learned about Man. Man is not the unit of the social, but is the most complex unit of the living. Economics must therefore proceed from this knowledge of Man and add to it knowledge of the social. To do this, reflection must abandon its aristocratic postures and consent to interest itself in “the animal Man [...], the animal with high

⁴⁶ *Le Réformateur*, Prospectus, October 8, 1834.

⁴⁷ Raspail, 1872, *Réformes sociales*, 107.

⁴⁸ Raspail, *Cours élémentaire d’agriculture et d’économie rurale à l’usage des écoles primaires* (Paris: Hachette, 1832), 355.

intelligence”⁴⁹ and his specific laws of development. We are back to “the terrain of physiology” but immediately recognizing that instincts and habits are specific to each animal genus or species and that, in the case of Man, the primary instinct, the “social law,” is sociability, “the irresistible and lasting need that Man feels to live in common with those that nature made his brothers, by organizing them like him.”⁵⁰ As the science of “the happiness of all,” of the harmonious development of human faculties, economic science must then discover in what original unit Man can develop his faculties and best fulfill his sociability, and how these units in turn agglomerate; it must also specify the characteristics of the environment that would most favor the realization of the specific law of the ever-growing complexity of the social.

Thirdly, while economics is a simple knowledge, it is not a knowledge without tools. Clearly, according to Raspail, one cannot be satisfied with the new scholasticism propagated by too many economic texts. Economics is, manifestly, a science of observation, a science in which the mind “often sees no necessary link [and] limits itself to grasping some scattered laws, establishing some natural groups, which facilitate the advance of its studies without always consolidating them.”⁵¹ Like vital chemistry, economics must therefore draw on the older sciences, in particular chemistry and physiology, find analogies, exploit complementarities, but without losing sight of the specificity of its object. Now, in the domain of economic science

⁴⁹ “We shall hasten to leave these exalted regions of the science of salons and the stockmarket. We shall take Man on earth and in society, the Man of suffering and pleasure, the Man of need and opulence, the Man of hate and love, whom good health inspires and sickness extinguishes, in a word Man as an animal, the animal of high intelligence; and to understand him, we shall only resort to the rules followed in the study of the other beings that vegetate or move like him. To protect him, nourish him, enlighten him, to console him in accordance with the particular laws of his organization—that is to govern him; that is to conduct true political economy” (Raspail, 1872, *Réformes sociales*, 235.)

⁵⁰ Raspail, 1872, *Réformes sociales*, 238.

⁵¹ Raspail, François-Vincent, and Jacques-Frédéric Saigey, “Discours préliminaire,” in *Annales des sciences d’observation* (Paris: Baudoin, 1829), 8. In a later article in *Le Réformateur*, he notes: “Political economy is not one of those solitary sciences, for which reasoning suffices to obtain precise data and lead to practical results. It is an assemblage of scattered facts, whose relationships are nil or are unintelligible, facts which allow a more or less arbitrary classification, but not rigorous deduction. They can be counted and recorded, but not guessed” (Raspail, *Le Réformateur*, article of October 27, 1834).

the analog of the microscope does indeed appear to be the survey. Raspail underlines that administration is made simple by “classification and survey,” and he develops a methodology for social surveys directly inspired by his reflections on universal suffrage and trial by jury.⁵² The voice that each vote, each judgment represents must derive from competence.⁵³ But competence is not the preserve of a privileged few, providentially endowed with money, property or rank, but the mark of “[those] who invent, who create, who add one more result to the mass of our results.”⁵⁴ This addition can only derive from the encounter and exchange of competent opinions, in short, according to Raspail, generalized “public discussion.” Outlining the most characteristic features of a genuine regime of discussion, Raspail notes: “There would not be only one assembly, one single deliberative body; we would deliberate, as we do today, in *départements*, in *arrondissements*, in *cantons*, in *communes*.”⁵⁵ It is this conception of competent knowledge that is directly applied to the domain of political economy. In an article, “Sur l’enquête,” published in *Le Réformateur* of October 27, 1834, Raspail criticizes the industrial survey launched by the government and carried out solely by the official experts. In the months that followed, he put his theory of surveys into practice, using his newspaper to publish many agricultural and then industrial surveys based on the “assistance of all the persons competent in political economy.”⁵⁶

Between the Individual and the State: The *Commune*

For Raspail, it is indeed the commune that constitutes the elementary unit of social life. This elementary unit cannot, he explains, be either the individual or the State.

⁵² It should be recalled that trial by jury, together with freedom of the press, was one of the main gains of the Charter of July 1830.

⁵³ “Thus the vote is bounded by competence; the utterance of opinion is bounded by knowledge of the subject. Universal suffrage can therefore not be the reasoned vote of all on every particular question, but the vote of each on all the questions on which he has something useful to say” (Raspail, 1872, *Réformes sociales*, 214).

⁵⁴ Raspail, 1872, *Réformes sociales*, 215.

⁵⁵ Raspail, 1872, *Réformes sociales*, 221.

⁵⁶ Raspail, *Le Réformateur*, article of January 24, 1835.

The individual is indeed a unit in the realm of the living, but not in the realm of the social. At the social level, the isolated individual remains incomplete, because he is unable to fulfill the law of sociability. The fulfillment of this sociability first requires resituating him in an environment, “some kind of society,” but also ensuring that, in contact with this environment, he will be able to develop the habits and beliefs capable of completing him. These habits and beliefs, indirectly shaped by the environment change constantly and, Raspail observes, in particular with the growth of societies: “The manners of a people are constantly modified under the influence of the same cause; for manners are only relationships, and relationships vary according to the number that surrounds us” and, making his point of view clearer, to distinguish it from all the literature of the “psychologists” (the spiritualists) obsessed with determining the essence of Man, he adds: “Manners are capable of varying with the variations of the framework of association, without becoming either better or worse. Man is essentially the same, alone or in society, his habits and his inclinations remain the same; only his relationships change with the growth of association, and these relationships make manners.”⁵⁷ Any transformation therefore requires time. Raspail shows, for example, that, in the present, characterized by social disorganization, it would be totally unrealistic to try to establish equality immediately, although the naturalist philosopher sees equality abstractly on the horizon of the law of sociability: “One can never establish natural laws; one must only aim to conform to those of nature, which alone has the power to create rules one can respect. The present inequality is a fact of our physical organization; one undergoes a fact, one does not struggle against it.”⁵⁸ Only a slow transformation of the environment and of adaptation to the environment can truly change this situation: “Giving to each what suffices for his kind of needs, and even his whims, to each in the specialty of its organization; and, at the same time, preparing men by education to reform whatever is vicious in their nature, so to approach as closely as possible that point of perfection for which the species Man seems to have been created—a still very distant outcome no doubt, but one that leads to the most perfect and lasting equality among all the individuals of the same family.”⁵⁹

⁵⁷ Raspail, 1872, *Réformes sociales*, 149–150.

⁵⁸ Raspail, 1872, *Réformes sociales*, 134.

⁵⁹ Raspail, 1872, *Réformes sociales*, 135.

The State, for its part, is indisputably an important unit of the social; but it is not the elementary unit. It is, on the contrary, one of the most complex units of the social. Thus Raspail writes that the State, correctly conceived (hence in a Republican context), will be the “great association of all the *communes*.”⁶⁰ So, in his view, on the one hand, the upward movement of sociability does not originate in the State, and on the other hand, and most fundamentally, the State is not the primary unit of transformation. At the level of the social, the process of exchange and transformation that leads to sociability is “public discussion,” “contradictory discussion.”⁶¹ And it is at the local level, in the *commune*, that this discussion takes its most varied, most accomplished and most continuous forms. Thus, when society grows and, above all, becomes more complex, it is, contrary to appearances, necessary to decentralize,⁶² it is mainly at the local level that discussion can renew itself, experiment, and allow all the combinations of the social to proliferate: “In all local questions, the *commune* is the competent jury, the jury made up of witnesses who are also judges, and who, if they are parties to the case, decide among themselves and according to the opinion of the majority; it is the most enlightened and most expeditious tribunal, it is the family council.”⁶³ Only at a later stage, when the general interests of *communes* may come into conflict, should there be conciliation at the central level, that of the State. Raspail rejects the idea of a specialization making the centralization of functions and

⁶⁰ Raspail, 1872, *Réformes sociales*, 122.

⁶¹ The term “contradictory discussion” is used with regard to the method of inquiry in the article in *Le Réformateur* of October 27, 1834. Shortly thereafter, Raspail launched in the pages of his newspaper an “Appeal to the press of the *département* to transform conflictual relations among men,” which was then omnipresent under the July monarchy, to transform antagonism, to “change quarrels into discussion and tribunals into arbitration,” through the trialing of a “voluntary institution for conciliation on all disputes between men” (Raspail, 1872, *Réformes sociales*, 253).

⁶² The centralization–decentralization debate was then one of the dividing lines among Republicans.

⁶³ Raspail, 1872, *Réformes sociales*, 173. The *commune* expresses a will of its own, the sign of a specific realm of intelligence and identity; the State, Raspail explains, will only apply the general will, “but who shall express this general will? The representatives of the *communes*, who alone can give an informed expression of it. The *commune* thus has a will; and by *commune* we mean a variable unit, which may be composed of one or several agglomerations, provided that the members who make it up can be regarded as inseparably united in their wills and interests. If this unit has a will, it is emancipated, it is master of itself” (Raspail, 1872, *Réformes sociales*, 207).

competences indispensable in modern States. He underlines that this idea is only valid for a situation in which the center has pillaged the periphery. The counterexample here is Germany, where, with the dispersion of its universities and its scientific institutes, a “genuine intellectual republic” is taking shape, but the lesson is valid in general and, returning to the elementary level of the *commune*, Raspail emphasizes: “It is not uncommon to find a village where every inhabitant can read, write, calculate, grasp history and politics, and where the schoolmaster, priest or father of a family is at the same time the editor of a village gazette.”⁶⁴ So it is because particular interests are formulated most consciously there,⁶⁵ and because the issues at stake in social collaboration social can be defined most precisely, that the *commune* is the equivalent, in the social realm, of the “laboratory cell,” and “contradictory discussion” can develop most naturally at this level.

Law of Association and Development

“To live is to develop,” Raspail insisted, to move toward greater organization and complexity. The same is true for the social realm as for the realm of the living, and the goal is to ensure a harmonious “constant progression” for this development. It has to be recognized, however, that, at the present time, it is rather chaos that prevails, and society is characterized by penury resulting from wastage and disorganization. But this is not the fault of nature: “Nature,” Raspail writes, contradicting the Malthusian vulgate, “is not a liar. It does not play with humans, it does not invite them to feasts in order to amuse itself with the hunger that devours them.”⁶⁶ There is no natural inevitability. But nor is there a social inevitability; whole swathes of contemporary literature expatiate on the inevitable corruption of large and especially urban societies: it stresses the degeneration of the individual in modern

⁶⁴ Raspail, 1872, *Réformes sociales*, 177.

⁶⁵ “What interest is more local than that of the inhabitants of the *commune*, in respect of education, labor, food and fortune?” Raspail observes, and continues: “The *commune*, methodically organized, must know the exact number of its inhabitants, their means of existence, the amount of the consumption of each of them, the type of labor which provides each with his subsistence; and, finally, the resources and products that the soil and commercial position of the locality make available to it” (Raspail, 1872, *Réformes sociales*, 183.)

⁶⁶ Raspail, 1872, *Réformes sociales*, 126.

cities, the generalization of deceit as the norm of social relations.⁶⁷ But here too, Raspail says, there is no social inevitability whereby the growing complexity and modernization of societies naturally lead to this corruption; rather than resignation, the present situation calls for a voluntarist form of regulation, reform, which should concern first and foremost “the most enlightened part of the working class.”⁶⁸ But it is the present-day social organization that should be challenged, in as much as, by hindering the law of social development, it is the cause of the present stagnation. What is this law? It is the law of association, not political, conspiratorial association, “association *plays at society*,”⁶⁹ Raspail observes, but social agglomeration, a situation favoring the liberation of human potential: “In the state of social agglomeration, the strength of Man is multiplied tenfold, his heart opens up to trust; he senses that he is born for this position, that his existence is bound to that of others.”⁷⁰ Like every law, it is a simple law, valid statically but above all dynamically: “The perfecting of association should progress by virtue of the growth of the population itself. Whenever this increases numerically, without association multiplying its advantages, the social equilibrium is shaken and explosion becomes inevitable.”⁷¹ How are this disequilibrium and breakdown manifested? It is generally supposed that explosions occur when certain formal rights are flouted. This strictly political, bourgeois view should, according to Raspail, be completed by taking economic and social factors into account: “Revolution breaks out to win a right; but this right is the free exercise of a material function; Man does not revolt in order to live, but to live independently.”⁷² From patriarchy, through the city-state to large-

⁶⁷ Raspail refers here in particular to the literature of the physicians and social observers who had founded the *Annales d'hygiène et de médecine légale* in 1829.

⁶⁸ Raspail, 1872, *Réformes sociales*, 161.

⁶⁹ Raspail, 1872, *Réformes sociales*, 141.

⁷⁰ Raspail, 1872, *Réformes sociales*, 139. The association was then the central subject of doctrinal writings by Saint-Simonians, Fourierists and dissidents (Pierre Leroux, Philippe-Joseph-Benjamin Buchez), political writings (pamphlets, essays, Republican newspapers), and in the labor movement. On the last point, see in particular Octave Festy, *Le Mouvement ouvrier au début de la monarchie de Juillet (1830–1834)* (Paris: Cornély, 1908) and William Sewell, “La confraternité des prolétaires: Conscience de classe sous la monarchie de Juillet,” *Annales. Histoire, sciences sociales* 36, no. 4 (1981): 650–671.

⁷¹ Raspail, 1872, *Réformes sociales*, 147.

⁷² Raspail, 1872, *Réformes sociales*, 148.

scale society, there is a quantitative and qualitative multiplication of social exchanges, combinations; as in the biological realm, there is a general law of evolution, a law that is a driving force, manifesting itself in ever-growing complexity: from the elementary unit of the *commune*, it moves to bigger, more complex agglomerations, and finally to the State, “the great agglomeration of humans.”⁷³ But this first law, specific to the biological and the social, must reckon with a second law—the educative role of the environment. Here, the realm of the social expresses its specificity, and it is clear that adaptation raises unique problems, problems which define the tasks of “economic science.”⁷⁴

Social Reform

The domain of the social presents many analogies with the realm of the living, and the inquiries carried out by Raspail enabled him to identify in the *commune* and in association the analogs of the cell and the process of composition. But what about the problem of the organization of the social, i.e. the degree of adaptation to the environment that governs the rhythm of development and therefore the accession to ever more evolved and complex states? The answer is reform. Reform is, in the literal sense, a transformation: it unfolds gradually over time; it necessitates neither antagonism, nor selection, nor struggle.⁷⁵ Raspail does not set himself in a selective evolutionist perspective. At the social level, there is therefore no normality, no fruitfulness, in antagonism: “Let us break down this great wall of demarcation which divides the classes,” he writes, adding: “So let us not either raise the classes against each other; let us not attack men, but institutions.”⁷⁶ The priority of reform thus lies in the relation of the social to its environment. Here, to return to Canguilhem’s terms, Raspail conceives that, for Man, this organization is as much a problem solved as a problem to be solved, since, in contrast to the other living things, Man may be

⁷³ Raspail, *Le Réformateur*, April 25, 1835.

⁷⁴ “Economic science aims to find a form of government that falls in step with all these progressive modifications, advances in time with civilization and never constitutes one of those obstacles to it that necessitate an explosion” (Raspail, 1872, *Réformes sociales*, 148–149).

⁷⁵ “A revolution must consist in proclaiming the progressive law of reform, supporting its development, and favoring the everyday applications of its innovations” (Raspail, 1872, *Réformes sociales*, 184).

⁷⁶ Raspail, 1872, *Réformes sociales*, 129, 131.

shaped by his environment but can also to a large extent shape and manage it himself. Two perspectives open up here: Man in society can act by rectifying what is at the heart of the present hiatus, the discrepancy between social development and the political environment, reshaping the political environment to structure and support social development instead of hindering it; and then he can act by transforming the natural environment—and, Raspail adds, this socially organized work on nature produces original political properties.⁷⁷

The reformed environment in which social life should develop harmoniously (the combination of *communes*) must, according to Raspail, present two general properties:

1. Bring people to agree among themselves on their common interests and settle their differences peacefully;
2. Progressively increase the quantity of products, so as to be able to meet the needs and satisfy the whims of the mass.⁷⁸

For Raspail, the second condition has priority. The creation of a nurturing environment makes it possible to attenuate the main sources of conflict and prepare for their resolution. The general reform to be undertaken then concerns the political environment, but also, and especially, the natural environment.

As regards the political environment, it is immediately clear that these conditions totally rule out monarchy. This regime, according to Raspail, on the one hand leads to a generalized waste of resources, and on the other hand sets antagonism at the heart of social relations. The government of one person, duplicating that form of political autism at all levels of administration, limiting all forms of exchange and

⁷⁷ “Our artificial means may greatly modify the environment in which we live” (Raspail, 1843, *Histoire naturelle*, 24.)

⁷⁸ Raspail, 1872, *Réformes sociales*, 133.

discussion, is “a nonsense, a moral anomaly” and it is certain “that the monarchical system cannot coexist with this system of progressive association.”⁷⁹

The evolution of the political environment, the move to a Republican system, based on election and trial by jury and favoring associations, will then make it possible to shape the natural environment. Raspail deals with this shaping of the environment through the questions of taxation, on the one hand, and social cooperation on the other.

Taxation, which was then at the center of all polemics—the post-1830 régime was overtly returning to the period of the *droits réunis*, ultimately to feed an army of parasites—should not be regarded as pillage and extortion; in a healthy political environment, taxation has above all a multiplying function: “Tax becomes a social fund, the benefits of which return to their source, so that this part of my income transferred to the common treasury, far from stagnating there or being dissipated, returns as in a fertile, nutritive circulation to feed and fatten the whole social body.”⁸⁰ Again using the metaphor of fluids, Raspail here analyzes the economy as a circuit of crisscrossing flows but in which the intervention of the various human associations (the *communes* and the State) favors the multiplication of wealth. Wealth is multiplied through a twofold transformation: mobilizing resources and rationalizing their use, taxation, well used, makes it possible to orient activity and transform the natural environment. For Raspail, opinion is at present troubled by the misuse of taxes, this opinion must be led to see that, in a different political environment, the existence of this “common mass” is indispensable for the growth of

⁷⁹ Raspail, 1872, *Réformes sociales*, 166, 144. Raspail—and it becomes clearer why he was so often consigned to Louis-Philippe’s prisons—even goes so far as to assert that monarchy constitutes a degenerative form of the social: “It is certain that heredity more often gives rise to these genealogical lacunae than any other form of government. To maintain legitimacy, individuals of royal stock take great care to marry only with royal blood, so denying themselves the potent fertility of the mingling of breeds, for fear of degenerating from their original nobility. The genealogical tree is gradually weakened for lack of regeneration through grafting, so that their offspring no longer have the appearance of men, nor even of kings” (Raspail, 1872, *Réformes sociales*, 225–226).

⁸⁰ Raspail, 1872, *Réformes sociales*, 116.

resources.⁸¹ But taxation also makes it possible to directly modify the human agent, and in particular to realize the potential of the true industrialists, “the most enlightened part of the working class,” with a “humane administration” here having the task of “improving, relieving, instructing, harmonizing conditions, balancing the sum of needs with the sum of resources, adapting labor to physical organization, occupation to intellectual capacity, inspiring in each nature the taste of a pleasure that consoles by ennobling it.”

But while Raspail evokes, through taxation, the future role of the central power in an established democratic context, when he thinks of the urgent present need for social development, he always returns to life and the unitary movement—to the activity of the *commune* and, more generally, to elementary forms of cooperation, the only means of imperceptibly transforming a present in which the regime of Louis-Philippe was trying to block all movement. The current situation is one of generalized penury, although with even the present knowledge, the soil should offer abundance. Cooperation should therefore be organized at the local level to make the best use of natural resources. Already in 1832 Raspail had imagined a system of agricultural fairs to improve yields and rationalize efforts. The exchange of services and the pooling of resources would enable the soils to be enriched and their yields multiplied a hundredfold, which would resolve the question of needs. Moreover, these experiences of cooperation at local level would also make it possible to experiment with representative habits modifying relationships and therefore behaviors, overcoming traditional differences.⁸² “Communal associations,” Raspail observes, introduce representative habits; and “representation transported into the *commune* is the seed of the Republic, the death of monarchy.”⁸³ It is clear that the collective efforts daily and concretely performed in shaping the natural environment are

⁸¹ “Should not the central administration at all times have the means at hand to come to the aid of local associations that are in jeopardy? Should it not repair disasters, support new initiatives, advance capital to flagging undertakings, generate new resources and multiply production?” (Raspail, 1872, *Réformes sociales*, 121.)

⁸² Raspail, 1832, *Cours élémentaire*, 482–483

⁸³ Raspail, 1872, *Réformes sociales*, 195.

probably the best vectors of transformation of the political environment.⁸⁴ What can be tried out in the agricultural domain, to improve soils and introduce cooperation, can, moreover, be extended and generalized: this pragmatic system of gradual transformation can be applied to lighting and heating:

“It is no longer utopian to imagine that a whole neighborhood of a city could be heated, from basement to attic, with the product of the combustion of a single hearth; the many applications of this economic heating, which have been made in the largest and most densely occupied establishments, have solved the problem as regards clusters of buildings belonging to several owners. So if a neighborhood is now heated by two hundred hearths, the savings from the provision of communal heating would be at least 180 out of 200 or 9/10ths, after deduction of the costs of the first establishment. At that point, we should have heat in winter for everyone.”⁸⁵

Conclusion

In *Le Réformateur* in April 1835, rounding off his series of articles “On economic science,” Raspail sums up his plan for social transformation: “The *commune* as the governmental unit, and the government as the sum of these units, as the confluence of their powers, as the result of their mutual relations”; further on, he continues: “[. . .] a union for sharing, a union for mutual assistance; a union, an agglomeration, a great body all of whose molecules live a life of their own and take part in a common circulation; a twofold operation, but an indivisible one, in which analysis and synthesis combine and feed each other; in which the division is the element of the association and the association only functions through the division.”

We have here, to say the least, an illustration of what Judith Schlanger referred to as “the rich impurity of the birth of knowledge, which links science to culture” (Schlanger, 1983: 136).⁸⁶ But, reading Raspail’s arguments, at the meeting point of

⁸⁴ In detailing the forms of local cooperation, Raspail writes, “we believe we are conducting a more practical politics than the politics of *representative chatter*” (Raspail, 1872, *Réformes sociales*, 201).

⁸⁵ Raspail, 1872, *Réformes sociales*, 212.

⁸⁶ Judith Schlanger, *L’Invention intellectuelle* (Paris: Fayard, 1983), 136.

organic chemistry, economics, and the Republican idea, one is also invited to nuance or expand several of the conclusions put forward in Canguilhem's studies mentioned at the start of this paper.

Distinctly prior to the ideas of Claude Bernard, we find here, in Raspail, from the early 1830s, an economic and political model of the living. More precisely, we observe a number of transfers and borrowings between cell theory and political economy, especially on the crucial question of the relationships between the whole and the parts. But what kind of economic model is it, precisely? Following the paths opened by Canguilhem or Yvette Conry, a number of commentators⁸⁷ have opportunely emphasized the importance of the economic concept of the division of labor, contemporary with the first great surge of industrialization, in the biological research of the time. The concept was popularized in France by Jean-Baptiste Say, who, in the first edition of his *Treatise on Political Economy* (1803), took up a notion that had already been at the heart of Adam Smith's argument in his *Wealth of Nations* (1776).⁸⁸ Having been adopted and spread by many economists, from Charles Dupin to Adolphe Blanqui, it was introduced into the life sciences by Henri Milne-Edwards. In 1827, Milne-Edwards placed a comparable mechanism at the very heart of the evolution and adaptation of living organisms, gradually identifying the most complex forms of life in a factory, where work is broken down, rationalized and hierarchized. In the early 1830s, such a conception of life and evolution could be grafted onto Saint-Simonian industrialism, which dreamed of reshaping society in accordance with the capability-based, centralizing and therefore reassuring model of a vast workshop, or, more precisely, concentrated manufacture. Here, unilaterally, the principle of economy or efficiency (including adaptability) dictated evolution toward a form of organization—hierarchized, concentrated and specialized—that resolved the question of the political (central command and union of the parts).

⁸⁷ Olivier Perru, "Le concept d'individualité chez Milne-Edwards," *Bulletin d'histoire et d'épistémologie des sciences de la vie*, 4/2 (1997), 147–172; Perru, "Zoonites"; Perru, "L'unité dynamique"; Schmitt, *Histoire*.

⁸⁸ It may be noted here that, as soon as Say's *Treatise* was published, the concept was subjected to a radical critique by Pierre-Édouard Lemontey, an author systematically quoted thereafter in the classic critiques of the concept, from Sismondi to Marx. Lemontey stigmatized a productive organization that reduced the worker to the rank of a mere "polyp."

Raspail, however, does not draw on this model; here he is much closer to the Fourierists (Victor Considérant or Constantin Pecqueur), to Pierre-Joseph Buchez or Jules Leroux, than to the classic economists or the orthodox Saint-Simonians (Barthélemy-Prosper Enfantin, Michel Chevalier or the Péreire brothers). The economic and political model that Raspail puts forward and which echoes his cell theory is based rather on observation and the defense of the model of dispersed manufacture and its population of skilled, politicized craftsmen. It is a model that we now know is economically effective and attuned to current industrial evolution by virtue of its networked organization and its complex, collective regulation; and, inseparably from this, it is a laboratory of new democratic forms of regulation.⁸⁹ In this model, it is the multiplication of exchanges (of goods and services, and most importantly, information) among units that gives rise to self-organization and hence the capacity of the whole to innovate and adapt. But none of the forms of proliferation of exchanges establish a viable regime of social development: for Raspail, the economy must here be synonymous with the growth of exchanges, vertically, but above all horizontally (since these are the true guarantees of sociability); and the *commune* (or any other micro-institution) is the basic unit of the social, because it is the best location for the multiplication and organization of this type of transaction. According to Raspail, economic and political evolution must be based on a system exploiting this type of transaction or communication; they cannot take place in a system of concentrated manufacture based on the fantasy of the expertise of a few “capable” managers and a tight chain of command and compliance. It is in this sense that Raspail’s endeavor is ingenious, since in his view social organization is as much a consequence of the inherent sociability of the human species as a self-assigned goal; this organization requires the invention and collective experimentation of original institutions (*communes*, cooperatives, mutual

⁸⁹ On this point, and specifically regarding the system of dispersed manufacture then found in the *Grande Fabrique*, the Lyons silk industry, see Alain Cottureau, “The Fate of Collective Manufactures in the Industrial World: The Silk Industries of Lyons and London 1800–1850,” in *World of Possibilities: Flexibility and Mass Production in Western Industrialization*, ed. C. F. Sabel and J. Zeitlin (Cambridge: Cambridge University Press, 1997), 75–152; and Ludovic Frobert, *Une Démocratie turbulente, Lyon 1831–1834* (Paris: Tallandier, 2009).

associations, community neighborhoods), where these communications can be tested and exploited.

Bibliography of Works by Raspail

Raspail, François-Vincent, *Nouveaux coups de fouet scientifiques* (Paris: Meilhac, 1831).

———, *Cours élémentaire d'agriculture et d'économie rurale à l'usage des écoles primaires* (Paris: Hachette, 1832).

———, *Nouveau système de chimie organique* (Paris: Baillière, 1833 [2nd edition, 1838]).

———, *Nouveau système de physiologie végétale et de botanique* (Paris: J.-B. Baillière, 1837).

———, *Lettres sur les Prisons de Paris* (Paris: Tamisey et Champion, 1839)

———, *Histoire naturelle de la santé et de la maladie chez les végétaux et chez les animaux en général et en particulier chez l'homme* (Paris: A. Levavasseur, 1843).

———, *Réformes sociales* (Paris: chez l'éditeur de M. Raspail, 1872).

François-Vincent Raspail and Jacques-Frédéric Saigey, "Discours préliminaire," in *Annales des sciences d'observation* (Paris: Baudoin, 1829).

Réformateur (Le). Journal quotidien des nouveaux intérêts matériels et moraux, industriels et politiques, littéraires et scientifiques, Paris, 8 October 1834–27 October 1835. (Newspaper edited by Raspail. See note 8 above.)