

From the accounts of *Philosophie rurale* to the physiocratic *Tableau*: François Quesnay as a precursor of modern accounting

Romuald Dupuy, Pierre Le Masne and Philippe Roman?*

October 2017

Preprint version – DO NOT CITE

Published version: <https://doi.org/10.1017/S1053837219000506>

Introduction

François Quesnay is generally considered as a founder of economics, even if many commentators reproach him with his view of industry as a “sterile” sector. Adam Smith devotes a chapter of his *Wealth of Nations* to the agricultural system and to the *Tableau* (Smith 1976: 663-688). Karl Marx (2000: 319) considers that the idea of representing the economy under the form of a *Tableau* “was an extremely brilliant conception, incontestably the most brilliant for which political economy had up to then been responsible”. Léon Walras (1988: 601-606) examines the physiocratic doctrine in his 37th Lesson of *Éléments d'Économie politique pure*. Wassily Leontief (1941) begins his *Structure of the American Economy 1919-1929* acknowledging a relation between his table and Quesnay's *Tableau* and asserting that he works out an economic *Tableau* of the United States.

Some scholars refuse however to consider Quesnay as an important scientist. In his *Economic Theory in Retrospect*, Mark Blaug (1973: 35) adds, after mentioning a translation into English of Quesnay's economic writings by Ronald Meek (1963): “It must be said that Quesnay was a poor expositor and that his writings abound in obscurities and inconsistencies”. Recapturing an expression of Alexander Gray (1931), Paul Samuelson (1982: 68) affirms at the end of an article on the *Tableau*: “Embarrassing or not, the *Tableau Economique* has been an interesting footnote in the history of economic thought. Dr Quesnay was not a young man when he first fabricated it”.

* Address for correspondence

Romuald Dupuy, University of Poitiers, Faculté de Sciences Économiques, 2 rue Jean Carbonnier, 86073 Poitiers Cedex 09, France, e-mail: etu.dpy@orange.fr.

Pierre Le Masne, University of Poitiers, Faculté de Sciences Économiques, 2 rue Jean Carbonnier, 86073 Poitiers Cedex 09, France, tel: (33) (0) 5 49 57 00 11, e-mail: le-masne.pierre@wanadoo.fr.

Philippe Roman, ICHEC Brussels Management School, 365a rue au Bois, 1150 Bruxelles, Belgium. e-mail : philippe.roman@ichec.be.

Should we take Quesnay's writings seriously? The explanations of the *Tableau* provided by numerous authors remain vague. The historians of economic thought consider different versions of the *Tableau* and introduce it in various ways. Ronald Meek (1963: 278) affirms after Marx (2000: 355) that in the *Tableau* the sterile class has no access to industrial products. Blaug (1973: 29), who reproduces the *Tableau* of *Physiocratie* (Quesnay 1767-68), affirms "There are obvious defects in the *Tableau*. The sterile sector is simply assumed to possess fixed capital, but no provision is made for its replacement"; for Blaug, Quesnay does not demonstrate "that agriculture necessarily yields a *produit net*". Henri Denis (1999: 170-179) notes considerable errors in the *Tableau* and considers the annual advances of the farmers as their subsistence of the year in a self-sufficiency economy.¹ Some authors wonder about the feasibility of the exchanges described by Quesnay.

Starting from the most complete work on it, namely *Philosophie rurale* (Mirabeau, Quesnay and Butré 1763; 2014), we show that the *Tableau* is coherent. The *Tableau* evolved through time and reached its mature form only in *Philosophie rurale* and in later texts, *Éléments de la Philosophie rurale* (Mirabeau and Quesnay 1767), and *Physiocratie* (Quesnay 1767-68). *Philosophie rurale* was not understood at the time of its publication. The lack of understanding lasted for a long time: the figures of *Philosophie rurale* are still considered incomprehensible by the 1958 editors of the *Œuvres de Quesnay* (Quesnay 1958: 687). Fortunately, later works such as those of Meek (1963), Walter Eltis (1996) or Christine Théré, Loïc Charles and Jean-Claude Perrot (editors of the 2005 *Œuvres de Quesnay*) have taken *Philosophie rurale* seriously.

On the occasion of the 2014 reedition of *Philosophie rurale*, the first critical reedition since the 18th century, two of us (Romuald Dupuy and Pierre Le Masne) measured the importance of this work. The accounts of chapter VII are difficult, they contain errors, but they are understandable. The *Tableau* of *Philosophie rurale* and the *Tableau* of *Physiocratie* result from these accounts.

The title of Samuelson's article is "*Quesnay's 'Tableau Economique' as a Theorist would formulate it today*". Recapturing a part of his idea, we show in a very different way that the *Tableau*, which is coherent and innovative, can be written in modern forms as input-output tables or private accounting. Starting from the accounts of chapter VII, we show how Quesnay arrived at the zig-zag *Grand Tableau*. We transpose the accounts of chapter VII and the *Grand Tableau* in two ways: firstly, into two input-output tables (in order to explain the balance of uses and resources), secondly into three double-entry accountings (in order to better understand the exchanges during the year).

The transposition of Quesnay's *Tableau* into input-output tables allows us to compare physiocratic accounting with modern national accounting. Quesnay's accounting focuses on net product ["*produit net*"] while national accounting focuses on value added, but we argue that it is possible to move from Quesnay's system to national accounting. The details of the *Tableau* are comprehensible if we choose a definite *Tableau* and avoid mixing details coming from different *Tableaux*. We focus on the *Grand Tableau* and on the *Précis* of *Philosophie rurale*. We ask precise questions on this *Tableau*: What are the various advances made up of: original advances ["*avances primitives*"], annual advances ["*avances annuelles*"], sterile advances ² ["*avances stériles*"]? How are treated the intermediate consumptions of the economy? Which are the equivalents of Quesnay's net product and interest ["*intérêt*"] in modern

¹ Meek's criticism concerning the *Tableau* is correct, but the accounts of chapter VII of *Philosophie rurale* allow to take account of the industrial products for the sterile class. As the *Tableau* of *Physiocratie* given by Blaug does not include original sterile advances, no provision can be made for the replacement of these advances. Quesnay does not say, contrary to Blaug's affirmation, that agriculture necessarily yields a net product: he considers that the small-state cultivation ["*petite culture*"] has generally no net product or a weak net product. The monetary advances of the farmers allow to buy agricultural and industrial products: the farmers do not live in a self-sufficiency economy (Henri Denis).

² We do not treat in this article of "*avances foncières*" ["*land advances*"], as *Philosophie rurale* does not speak of these advances of the proprietors, sometimes evoked by Quesnay ((Quesnay 2005: 144), Mirabeau and Quesnay (1767: 22)).

national accounting? Do farmers and agricultural workers consume industrial products? And the members of the sterile class? What is the amount of money supply and how does it circulate during the year? Our answers introduce several elements that are complementary to another work, in French (Le Masne 2016), dedicated to the similarities between Quesnay's *Tableau* and Leontief's model. This study does not answer the preceding questions and does not establish a comparison between the physiocratic accounting and national accounting.

The three classes in Quesnay's work are called "class of proprietors", "productive class", and "sterile class". In the accounts of *Philosophie rurale*, the productive class is broken down into two sub-groups, farmers and agricultural wage-earners,³ and we use this decomposition. To distinguish sub-groups with monetary relations inside the classes (the farmers remunerate the agricultural wage-earners) does not contradict the existence of three fundamental classes in society.

The first section of the article makes a presentation of the *Tableau*, largely based on *Philosophie rurale*. The second section transposes the accounts of chapter VII into two input-output tables, the second of which corresponding to Quesnay's *Tableau*. The third section transposes Quesnay's *Tableau* in the form of three double-entry accountings (proprietors, farmers and artisans).

1. The evolution of Quesnay's *Tableau* and the *Tableau* of *Philosophie rurale*

1.1 The successive versions of the *Tableau*

The history of the *Tableau* is complicated.⁴ The first zig-zag version was developed in late 1758 and includes already three columns corresponding to the three classes of the *Tableau* (Quesnay 2005: 397-403). The second zig-zag version in early 1759 was not very different (Quesnay 2005: 404-411). The third zig-zag version of Summer 1759 (Quesnay 2005: 412-438) mentions in the upper part of the *Tableau* twelve objects to consider ["12 objets à considérer"], also given in the two following versions: The *Tableau* is thus connected to various economic elements (see the 12 elements in the upper part of Table 1); the net product is 1,050 (600 for the proprietors, 450 for the State and the tithe). The fourth version, *Tableau oeconomique avec ses explications*, published in 1760 (Quesnay 2005: 412-438), extends economic modelling. The *Tableau* does stabilize with the fifth version given in *Philosophie rurale* (1763), whose *Tableau* is elaborated by Quesnay and Charles de Butré.⁵ The net product increases from 1,050 to 2,000 (or 2,000 million of *livres tournois*).⁶ A new form of *Tableau* appears, the *Précis*, which completes the zig-zag. Detailed accounts of agriculture are given. A last form of the *Tableau* appears in *Physiocratie* in 1767-68 (Quesnay 2005: 545-635) but the economy described remains the same as in *Philosophie rurale*, and *Physiocratie* refers to chapter VII of *Philosophie rurale* (Quesnay 2005: 556).

Quesnay modified several times his *Tableau* during the first years. The successive modifications reflect dissatisfaction, and difficulties or errors which he tried to correct. So, the approach evolved. In 1758, Quesnay explained the reproduction of the economy and described the disturbances concerning this reproduction. Later, the *Tableau* gave an increasingly precise representation of the economic circuit.

³ Quesnay (2005: 624), "Second Problème économique", breaks down in that way the class of proprietors in two sub-groups, the proprietors and the State.

⁴ Meek (1963), Herlitz (1996), Théré, Charles and Perrot (Quesnay 2005: 391-396, 639-687) provide elements on the history of the *Tableau*.

⁵ *Philosophie rurale*, published in 1763-64 without any author name, was attributed to Mirabeau and Quesnay. It was recently shown that Charles de Butré has played a role in the writing of the book, in particular for the *Tableau*, which is elaborated in collaboration between Quesnay and Butré. On the role of Butré, Théré and Charles (2008), Dupuy and Le Masne (2014), Le Masne and Le Masne (2014), Sabbagh (2015).

⁶ This amount was approximately (1,938.25 millions) already given in *Théorie de l'impôt* (Mirabeau and Quesnay 1760: 165).

Quesnay modified hypotheses in order to overcome difficulties (Steiner 1992: 242). Considering the successive changes of hypotheses, no single *Tableau* can make a synthesis of all the previous ones (Herlitz 1961, 1996).

Philosophie rurale provided in 1763 the mature version of the *Tableau*. Important changes appear in comparison to the *Tableau Economique avec ses explications* of 1760. Accounts of agriculture were introduced. While the *Tableau oeconomique avec ses explications* considers foreign trade (Quesnay 2005: 453), *Philosophie rurale* does not take it into account (PR⁷ 1763: 126; 2014: 256). Furthermore, the reflection on intermediate consumptions deepened. The *Tableau* of *Philosophie rurale* takes into account only the operations contributing to creation of the net product, leaving aside the other operations. The expenses of the sterile class to buy industrial products are accordingly excluded from the *Tableau*, because these operations do not contribute to the creation of net product.

1. 2 The Grand Tableau and the Précis of Philosophie rurale

The *Grand Tableau* of *Philosophie rurale* (Table 1) represents under a zig-zag form the French economy, or more precisely, the major part of this economy, the part which gives “*revenu*” (net product). The title of the central column of proprietors, “*Dépense du revenu*” (expense of net product), indicates that the net product and its circuit are at the centre of the preoccupations. The three classes of society engage in transactions and exchanges. After one year, after expenses of the three classes and after agriculture has reproduced his resources, the economy returns to its starting point: it is on a steady state. The *Tableau* distinguishes “*production*” and “*circulation*”, and focuses on “*circulation*”. The “*production*” is however mentioned with horizontal dotted lines starting from the advances of the productive class and leading to the net product [“*revenu*” in Table 1] of proprietors.⁸ The advances of the sterile class are not connected to the column of proprietors, as these advances have no productive dimension.

Agriculture has a gross production of 5,000 million (*livres*) and a net product of 2,000 million. The net product approximately doubled compared to the *Tableau oeconomique avec ses explications* (1,050 million). The transition to large-state cultivation is achieved, with a net product rate (net product/annual advances) of 100%.

The class of proprietors includes the Clergy and the State.⁹ The annual advances of the farmers consist, at the beginning of the year, of a money capital of 2,000, which will be paid to the proprietors and then reconstituted progressively during the year. According to the *Tableau*, these advances paid to the proprietors launch the economic circuit (PR 1763: 23; 2014: 100). The proprietors spend 1,000 in favour of the productive class and 1,000 in favour of the sterile class.

The productive class and the sterile class exchange their products, paying for their purchases in money. The advances of the sterile class (1,000) are fixed to a quarter of the sum of the advances of the

⁷ Hereafter, we give the references of *Philosophie rurale* in connection to the pages of the 1763 and 2014 editions.

⁸ “Traced points starting from the annual advances and leading to the income show that they are at the origin of the income” [“*des points tracés qui partent des avances annuelles et vont aboutir au revenu, montrent que ce sont elles qui sont à l’origine du revenu*”] (PR 1763: 35; 2014: 118)).

⁹ The taxes and the tithe are collected from the net product of the proprietors. As T. Barna (1975) remarks, the *Tableau* supposes the achievement of the fiscal reform.

productive class (2,000) and of the net product (2,000) (*PR* 1763: 117; 2014: 241).¹⁰ *Philosophie rurale* does not take the original advances of the sterile class into account.¹¹

¹⁰ The reason for this important rule is better explained in *Éléments de la Philosophie rurale* (Mirabeau and Quesnay 1767: 30) than in *Philosophie rurale*. The importance of the sterile class must be linked to the productive advances and to the net product. As the expense of proprietors is half in finished goods, and the purchases of the productive class to the sterile class are equal to one half of their annual advances (and to one half of the net product), as sterile advances constitute half of the resources of the sterile class, these sterile advances must be equal to $((\text{productive annual advances} + \text{net product}) / 2) / 2$, or to a quarter of the sum of the net product and the annual productive advances. The rule limits the importance of the sterile class activities.

¹¹ Industry is an activity of artisans, essentially rural, often at home (*PR* 1763: 32; 2014: 114-115).

TABLEAU ECONOMIQUE

Objets à considérer, 1°. trois sortes de dépenses ; 2°. leur source ; 3°. leurs avances ;
4°. leur distribution ; 5°. leurs effets ; 6°. leur reproduction ; 7°. leurs rapports entr'elles ;
8°. leurs rapports avec la population ; 9°. avec l'Agriculture ; 10°. avec l'industrie ;
11°. avec le commerce ; 12°. avec la masse des richesses d'une Nation.

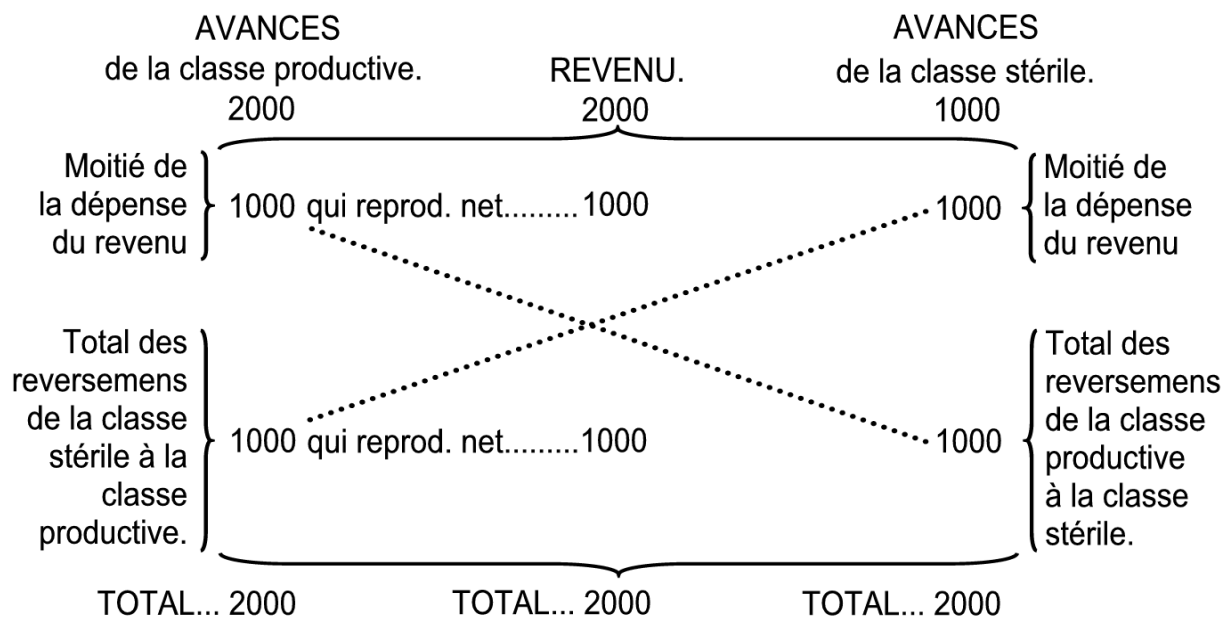
DEPENSES. PRODUCTIVES <i>Relatives à l'Agriculture, etc.</i> Avances annuelles pour produire un revenu de 2000.l ^t sont 2000.l ^t 2000.l ^t produisent net	DEPENSES DU REVENU, <i>L'Impôt compris, se partagent à la Classe productive et à la Classe stérile</i> Revenu Annuel de. 2000.l ^t	DEPENSES. STERILES. <i>Relatives à l'Industrie, etc.</i> Avances annuelles pour les Ouvrages des dépenses Stériles sont 1000.l ^t Ouvrages, etc.
Productions	Revenu	Ouvrages, etc.
1000.l ^t „s. „d	1000.l ^t „s. „d	1000.l ^t „s. „d
500 „ „	500 „ „	500 „ „
250 „ „	250 „ „	250 „ „
125 „ „	125 „ „	125 „ „
62 10 „	62 10 „	62 10 „
31 5 „	31 5 „	31 5 „
15 12 6	15 12 6	15 12 6
7 16 3	7 16 3	7 16 3
3 18 2	3 18 2	3 18 2
1 19 1	1 19 1	1 19 1
0 19 6	0 19 6	0 19 6
0 9 9	0 9 9	0 9 9
0 5 „	0 5 „	0 5 „
0 2 6	0 2 6	0 2 6
0 1 3	0 1 3	0 1 3
0 0 8	0 0 8	0 0 8
Total 2000.l ^t „s. „d	Total 2000.l ^t „s. „d	Total 2000.l ^t „s. „d

Il n'êt pas nécessaire de s'attacher à l'intelligence de ce Tableau avant la lecture des 7. premiers chapitres, il suffit à chaque chapitre de faire attention à la partie du Tableau qui y a raport.

Table 1: The Grand Tableau of Philosophie rurale (2,000 livres of net product)

After the *Grand Tableau*, *Philosophie rurale* gives another *Tableau* of the same economy, called *Précis* (see table 2). The *Précis* has a main part and two auxiliary parts which add elements compared with the *Grand Tableau*.

PRÉCIS DES RÉSULTATS
DE LA DISTRIBUTION REPRÉSENTÉE DANS LE TABLEAU



La reproduction totale est égale à toutes les sommes qui se réunissent et se dépensent à la classe productive, Sçavoir ;

Les avances de la classe productive.....	2000
La portion du revenu qui passe immédiatement à la classe productive.....	1000
Total des reversemens de la classe stérile à la classe productive.....	1000
Les avances de la classe stérile employées pour les achats des matieres premieres à la classe productive.....	1000
TOTAL ...	5000

Ainsi la reproduction totale est 5000, dont le Cultivateur retire pour ses avances et les intérêts de ses avances primitives et annuelles..... 3000

Reste pour le revenu.....	2000
TOTAL ...	5000

MASSE TOTALE des richesses comprises dans le Tableau.

La reproduction totale.....	5000
L'argent du revenu.....	2000
Les avances de la classe stérile, toujours conservées par les Agens de cette classe ...	1000
TOTAL ...	8000

Table 2: Précis of Philosophie rurale (2,000 livres of net product, Chapter IV)

The main part of the *Précis* shows the *Grand Tableau* in a simplified form. The top line of the *Précis* displays the advances of the productive class (2,000), the net product (or income) for the proprietors (2,000), and finally the advances of the sterile class (1,000). The numbers between the two bold horizontal braces represent the flows between the three classes of society. The flows on the left side concern the productive class. The top number (1,000) represents the purchases of proprietors to the productive class. The bottom number (1,000) represents the purchase of the sterile class to the productive class, made with the receipt of the 1,000 sales of the sterile class to the proprietors.

The first auxiliary part of the *Précis* explains in detail the “*reproduction totale*” (total reproduction). The authors focus on the productive class and analyse its receipts and expenses. The reproduction of 5,000 is the agricultural production of the year. A second auxiliary part appears at the bottom of the *Précis* with the title “*Masse totale des richesses comprises dans le Tableau*” (Total mass of the riches of the *Tableau*). The total riches of the economy (8,000) are the sum of the reproduction of agriculture (5,000), the money to pay the net product (2,000), and the advances of the sterile class (1,000).

2. The transposition of the accounts of *Philosophie rurale* into two input-output tables

2.1 The accounts of *Philosophie rurale*

In the accounts of chapter VII, agriculture includes 7 sectors, *Grains*, *Wine Production*, *Forestry*, *Meadows Production*, *other Parts (Mining and Fishing)*, *Livestock Production*, *rural Trade*. For each sector, *Philosophie rurale* gives the elements of the gross product, with a total gross product of 6,3672 billion (*livres*). Considering that the fodder expenses are intermediate consumptions, we give a distribution of expenses of the seven sectors into 5 elements: intermediate consumptions, salaries of the wage-earners, remunerations [“*rétributions*”] of the farmers, interests of the farmers, net product. On this basis, we reconstitute without difficulty the accounts of five sectors (with also their advances and population): *Grains*, *Wine Production*, *Meadows Production*, *other Parts*, *rural Trade* (see table 3). Two sectors contain errors, *Forestry* and *Livestock Production*. We explain in box 1 the two errors and our corrections. We keep the total gross production of the seven sectors of 6.3672 billion (*PR* 1763: 139; 2014: 278). Before our corrections, table 3 is identical to the accounts of *Philosophie rurale* given by Milanovic (2015).

(unit: millions of livres tournois)	Grains (S. I)	Wine Prod. (S. II)	Forestry (S. III)	Meadows Product. (S. IV)	Other Parts (S. V)	Livestock Product. (S. VI)	Rural Trade (S. VII)	All Sectors
Intermediate Consumptions (fodder)	0	0	0	0	0	600	300	900
Salaries of wage-earners	771	225	225	50	200	300	100	1,871
Remunerations of farmers	300	75	28.8	14.4	0	0	120	538.2
Interests of farmers	608	30	60 135	24	20	215 0	240	4,197 1,057
Net Product (1)	1,071	300	300	250	80	0	0	2,001
Gross Production	2,750	630	688.8	338.4	300	900	760	6,367.2
Annual Advances (2)	1,071	300	253.8	64.4	200	900	520	3,309.2
Original Advances	6,080	300	600	240	200	2,150	2,400	1,1970
Total Advances (3)	7,151	600	853.8	304.4	400	3,050	2,920	15,279.2
Rate of Net Product (1)/(2)	100%	100%	118.2%	388.2%	40%	0	0	60.5%
Rate of Surplus (1)/(3)	15.0%	50.0%	35.1%	82.1%	20%	0	0	13.1%
Population (Thousands)	7,168	1,800	1,896	496	1,680	3,260	1,200	17,500

Table 3: Accounts of agriculture (chapter VII, *Philosophie rurale*)

The first error affects *Forestry* (PR 1763: 134; 2014: 271-272): an amount of 75 misses to arrive to the 688.8 total. The second error concerns *Livestock Production* (PR 1763: 136-137; 2014: 274-75): the gross production of 900 million is the total of fodder (600) and salaries (300). This sector includes also 215 interest that cannot be taken from the 900 million. The text says that they find themselves again in other sectors (PR 1763: 137-137; 2014: 274), which is wrong. The 215 interest are included in the total interests of the farmers (1,197) but not in the interests of the 6 other sectors.

On one hand, an amount of 75 misses in *Forestry*, and on the other hand 215 interests are not accounted in *Livestock Production*. We compensate partly the two errors. An amount of 75 interest is recorded in *Forestry*; the *Forestry* interests increase from 60 to 135. The 215 interests of *Livestock Production* have now a counterpart for 75. 140 interests remain without counterpart: we reduce therefore the total interests of the farmers of 140: 1,057 instead of 1,197. The amended figures in table 3 are crossed out and replaced by new figures.

Quesnay saw an error in the accounts of chapter VII which he tried to correct in *Éléments de la Philosophie rurale*. The correction appears by comparing *Eléments de la Philosophie rurale* (Mirabeau and Quesnay 1767: 170) to *Philosophie rurale* (PR 1763: 138; 2014: 277). Quesnay introduced collective meadows [*dépaîtres*] in order to find a new resource, but the correction is not satisfactory.

Box 1: The accounts of agriculture (chapter VII) and the corrections made

2. 2 Transposition of the accounts of chapter VII and of the *Tableau* into input-output tables

The idea to transpose Quesnay's *Tableau* into an input-output table goes back to Phillips (1955). Phillips introduces a closed Leontief model with 3 sectors. Phillips, who relies on the *Tableau* of *Physiocratie*, makes no differentiation between intermediate and final flows. The 3 classes are productive, which does not correspond to Quesnay's ideas.

Barna (1975) considers that Phillips' presentation does not do justice to Quesnay, in particular because intermediate and final flows are aggregated. Barna provides detailed accounts (from the Summer 1759 Quesnay's *Tableau*). He distinguishes intermediate and final flows and takes foreign trade into account. Barna's input-output table represents an important progress compared to Phillips', even if the explanations about intermediate consumptions are insufficient and if the farmers' investment comes entirely from agriculture.

The transposition by Samuelson (1982), based on *Philosophie rurale* and *Physiocratie*, leads to a 3 sectors input-output table. Samuelson (1982: 57-57) considers rightly that the proprietors do not produce and have nevertheless a final consumption. But he merges intermediate and final flows for the productive class and for the sterile class, so that one does not know what the final consumptions of these two classes are. However, *Philosophie rurale*, to which Samuelson refers, specifies that the wage earners receive salaries (1,871 millions, see table 3) and the farmers receive remunerations (538.2 millions). How are these remunerations spent if the productive class has no final consumption? While neglecting the final consumption of the productive and the sterile class, Samuelson moves away from Quesnay's economy. Quesnay affirms that the 3 classes dispose of agricultural and industrial products. Samuelson did not understand the importance of exchanges in the physiocratic economy.

Our transposition looks like Barna's on several points, but we explain the treatment of intermediate consumptions in greater details, and we consider that a part of the farmers' investment comes from industry. Quesnay's *Tableau* refers to classes. It is possible, for the productive class (agriculture) and for the sterile class (industry), to identify class and activity sector. We must, however, distinguish intermediate flows and final flows, and, for the productive class, investment and final consumption.

The productive class and the sterile class are "*actives*" (PR 1763: 24, 49, 265; 2014: 100, 145, 468). The proprietors are not economically active and their role consists in consuming (Quesnay 2005: 218). The income of the proprietors is a transfer income, paid by the farmers and freely used by the proprietors.

We consider thus only two activity sectors: agriculture and industry. Within agriculture, we distinguish, based on *Philosophie rurale*, the farmers (who receive remunerations) from the wage-earners (who receive salaries). The farmers and the wage-earners buy agricultural and industrial products. The sterile class has receipts allowing it to buy agricultural and industrial products. However, its production of industrial products for itself is not recorded in the *Tableau*, as it does not generate net product.

The original advances (fixed capital) represent the capital necessary for the farmer who settles down in a farm for around ten years (a nine years lease plus a ten-month period until harvest time). The new farmer arrives in the farm on Saint Martin's day, as is the case in numerous French regions, on November 11 (calendar year n). The previous farmer has sowed wheat in October, and will come back to harvest for himself in July ($n + 1$). The new farmer will sow in October ($n + 1$) and harvest his first wheat in July ($n + 2$).¹² The original advances are what is necessary to the farmer to live until summer ($n + 2$): subsistences, fodder, seed for October ($n + 1$). Original advances include also the household furnishings of the farmer, and the capital necessary for the exploitation of the farm: on one side, industrial instruments such as ploughs or leather harnesses, on the other side animals as horses, oxen, sheep (*PR* 1763: 29-30; 2014: 109-110). The livestock represents the greater part of the exploitation capital, as noted in *Philosophie rurale* (*PR* 1763: 33; 2014: 115) and also by the historian Moriceau (1994: 268-271). To maintain the original advances, the farmers make use of their interests, a part of production.

Interest has a specific sense in physiocratic logic, and agriculture alone bears interest¹³. The farmers remove each year from the earth "*their costs, their remunerations and the interests of their advances*"¹⁴ (*PR* 1763: 80; 2014: 191). The interests represent 10% of the advances¹⁵ of the farmer. The interests are not a freely available income but a reserve, at the same time resource and use (Mirabeau and Quesnay 1767: 230-231). Beyond the maintenance of original advances [*"entretien des avances primitives"*] for 5% (*PR* 1763: 139-140; 2014: 280), this fund may be used for the other 5% in case of illness of the farmer (*PR* 1763: 80; 2014: 190-191) or in case of casual losses (*PR* 1763: 406; 2014: 681); if there is no loss, the other 5% increases the original advances. The maintenance of original advances depends on the circumstances, and the correspondance with a current depreciation expense or consumption of fixed capital (CFC) is not simple. A great part of original advances consists of livestock, whose maintenance depends on events such as epidemics. In case of epidemics, the whole interest is used to maintain the original advances. For the moment, we will assume (and that will be discussed later), that interests are entirely (10%) a consumption of fixed capital¹⁶.

The annual advances of the farmers are expenses made each year on the farm. They include the salaries of wage-earners, the remunerations of farmers and other expenses which we are nowadays used to calling intermediate consumptions. This question of intermediate consumptions leads us to speak of seeds, fodder and transportation costs.

Seeds are not considered, in the accounts of *Philosophie rurale*, as annual advances. For the first seeding of the farmer in October ($n + 1$), seeds are considered as original advances (*PR* 1763: 238-240; 2014: 426, 429). For the other years, seeds are sampled from production: from Summer ($n + 2$), the farmers

¹² The new farmer will harvest wheat for the first time more than one and a half year after his arrival ((*PR* 1763: 240; 2014: 429); (Butré 1781: 23-26)).

¹³ "*the free gift of earth can only, in the natural order and right, pay interests*" [*"il n'y a que le don gratuit annuel de la terre qui, dans l'ordre et le droit naturel, puisse payer des intérêts"*] (*PR* 1763: 105; 2014: 225-226).

¹⁴ "*leurs frais, leurs rétributions et l'intérêt de leurs avances*".

¹⁵ Interests are calculated on total advances or sometimes on original advances only. In *Philosophie rurale* the interests are calculated as 10% of original advances plus annual advances, 12,000, giving an amount of 1,200 (more precisely, 1,197).

¹⁶ This assumption corresponds to the interpretation by Meek (1963), Barna (1975: 490) and Samuelson (1982: 76).

retain from production the necessary corn, and production is evaluated “*out of seed*” [*semence prélevée*] (PR 1763: 129, 227; 2014: 261-262, 409).

Fodder is an annual advance that we consider as an intermediate consumption. Fodder feeds plough horses but also cows (for milk) and oxen (for meat). It is also essential for the rural trade, an agricultural activity which precedes consumption (PR 1763: 124; 2014: 253-254). Rural trade has a value added (salaries) and intermediate consumptions (fodder) but does not generate net product.

Philosophie rurale has recourse to two accounting systems, with the one fitting into the other, the first giving all the expenditures of the economy, the second only the elements concerning the net product and entering the *Tableau*. The authors (PR 1763: 125; 2014: 254-255)¹⁷

“*distinguish the distribution of expenditures of the different kinds of exploitation with the expenditures of the revenue of proprietors, and with the expenditures of remuneration of the agents of the productive class, and of the agents of the sterile class, as it is recounted in the Tableau, where we have restricted to the expenditures of the revenue of a Nation, and to annexed expenditures*”.

The first system displays an extended account of the French economy, with a gross production of 6.3672 billion (*livres*). It includes expenditures which have no effect on the net product, concerning livestock production¹⁸ and rural trade, with in particular fodder intermediate consumptions (900 millions) (PR 1763: 139; 2014: 277-278).

The second account system gives a gross production of 5 billion (*livres*) only. This reduced system is the basis of the *Grand Tableau* and of the *Précis*. The operations concerning livestock production and rural trade are eliminated or neutralised, because for the authors, these sectors do not contribute to the net product (PR 1763: 137; 2014: 275-276).¹⁹

“*These last parts of the productive class which cooperate to the production of income [net product], but which give no income, I speak of livestock for profit, and the expenses or rural trade of which it is now about, are not included in the Tableau which represents the order of the distribution of expenses and of the reproduction of incomes by the expense of income; as they give no income, they cannot enter in the Tableau of the distribution and reproduction of incomes, and as it needs only to evaluate them and to add them to the mass of annual reproduction, in order to complete the general and detailed assumption of the reports of products and expenses*”.

Three kinds of commerce take place between the classes (PR 1763: 38; 2014: 125). Next to the commerce of proprietors with the productive and sterile classes, next to the commerce between the productive class and the sterile class, other exchanges take place inside the productive class, for example between the farmers and their wage-earners: the farmers pay the wage-earners, who buy agricultural products on various markets. The members of the sterile class buy agricultural and industrial products. The shoemaker buys subsistence products for his family, and also leather in order to produce shoes.

¹⁷ We translate from French this important sentence : “ *distinguer la distribution des dépenses des différens genres d’exploitation d’avec les dépenses du revenu des propriétaires, et des dépenses de la rétribution des Agens de la classe productive, et celle des Agens de la classe stérile, telle qu’elle est tracée dans le Tableau, où l’on s’est borné aux dépenses du revenu d’une Nation, et à celles qui lui sont annexées*”.

¹⁸ Livestock production does not generate net product. However, for Quesnay (2005: 150-152), the production of oxen is a very profitable activity. The purchase of horses is expensive and these horses are sold for meat at the end of their life at a very low price. A compensation is made between the horses and the other animals.

¹⁹ “ *Ces dernières parties de la classe productive qui coopèrent à la production du revenu, mais qui ne donnent pas de revenu, je veux dire les bestiaux de profit, et les frais du commerce rural dont il s’agit présentement, ne sont point compris dans le Tableau qui représente l’ordre de la distribution des dépenses et de la reproduction des revenus par la dépense du revenu ; parce que ne donnant pas de revenu, elles ne peuvent entrer dans le Tableau de la distribution et de la reproduction des revenus, et qu’il suffit de les évaluer et de les ajouter ici à la masse de la reproduction annuelle, pour compléter la supputation détaillée et générale des rapports des produits et des dépenses*”.

With the money of the shoe sales, he buys, for example, sheets. But the *Grand Tableau* does not give account of the industrial purchases of the sterile class (as it does for the industrial purchases of the proprietors and of the productive class), because these purchases have no effect on the net product.

Next to the resources of agriculture (table 3), *Philosophie rurale* gives also the total uses of the 7 sectors of agriculture. These uses, given in the first column of table 4, must be corrected before juxtaposing them with resources in order to elaborate a table of uses and resources. The figures include the same error on interests, estimated at 1,197 in the original text and corrected at 1,057 (see box 1).

The fixed capital investment asks a difficult question. Corresponding to *Philosophie rurale*, the annual investment (1,197) originates entirely from agriculture (see the first column of table 4), without any industrial investment. However, the *Lisoir* farm of *Philosophie rurale* uses industrial fixed capital (*PR* 1763: 238-239; 2014: 426). The reflection on this point is not finished in *Philosophie rurale*. *Éléments de la Philosophie rurale* affirms later that the investment has an industrial part: it is necessary to buy back ploughs (Mirabeau and Quesnay 1767: 52-53). On this point, we follow *Éléments de la Philosophie rurale* rather than *Philosophie rurale*. We introduce an industrial investment, based on the large-state culture farm of *Lisoir* (*PR* 1763: 238-239; 2014: 426). The original advances of the *Lisoir* farm are made for the most part of agricultural goods (*PR* 1763: 29, 33; 2014: 109, 115), but include a small part of instruments of cultivation (6.2%) and of household furnishings (3.1%). The industrial elements represent 9.3% of total original advances. Rounding off to 10%, the investment of the productive class (1,057) includes agricultural goods for 951 (90%) and industrial goods for 106 (10%). The second column of table 4 corrects the agricultural uses of *Philosophie rurale*.²⁰

Table 5 gives, in relation to tables 3 and 4, the input-output table corresponding to the developed system of accounts of *Philosophie rurale*, with an investment derived from *Éléments de la Philosophie rurale*. Industry is presented in the same way as agriculture: this presentation may be considered as closer to national accounting than to Quesnay.

Uses of agriculture (millions of livres tournois)	According to <i>Philosophie rurale</i> (before our corrections)	According to <i>Éléments de la Philosophie rurale</i> (after our corrections)
Intermediate consumption of agriculture	900.0	900.0
Intermediate consumption of sterile class	1,437.1	1,545.2
Final consumption of wage-earners	883.0	949.4
Final consumption of farmers	231.6	249.0
Interests (Fixed capital investment)	1,197.0	951.0
Final consumption of sterile class	718.5	772.6
Final consumption of proprietors	1,000.0	1,000.0
Total Uses	6,367.2	6,367.2

Table 4: Uses of agriculture

The resources of the productive class (6,367.2) consist of agricultural intermediate consumptions (900) and of value added (5,467.2): net product (2,001), consumption of fixed capital (1,057), salaries (1,871) and retributions (538.2). The resources of the sterile class (3,090.4) consist half of value added (labour) and half of agricultural raw materials.

²⁰ The investment is of 951, instead of 1,197. The difference of 246 has 2 reasons. On one hand, we take account of the error of 140 of table 3. On the other hand, we introduce an industrial investment of 106. The difference of 246 (140 + 106) is transferred on other elements: intermediate consumption of the sterile class, final consumption of the farmers, of the agricultural wage-earners and of the sterile class, in proportion to the amounts of these elements in the first column of table 4.

The productive class delivers agricultural products to the sterile class as intermediate consumptions (1,545.2) and as subsistences (772.6). It delivers also subsistances to the proprietors (1,000). The final consumption of the farmers is equal to their remunerations and the final consumption of the wage-earners to their salaries²¹.

In order to obtain accounts corresponding to the *Grand Tableau*, table 6 merges the sectors I to V of table 3. The columns of sector VI (*Livestock Production*) and VII (*Rural Trade*), whose net product is null, are suppressed: the fodder expenditures (and the intermediate consumption of agriculture) disappear. We add a last column, corresponding to the figures of the *Grand Tableau*. The figures of this column are rounded. Without rounding, it would be impossible, starting from a set of accounts, to arrive to the physiocratic proportions, for example to annual advances equal to net product, or to original advances equal to five times the annual advances (*PR* 1763: 34; 2014: 117). The gross production increases from 4,707.2 to 5,000, the net product decreases from 2,001 to 2,000. The salaries of the wage-earners are of 1,550 and the remunerations of the farmers of 450²², for annual advances of 2,000 and a rate of net product of 100%.

(unit: Millions of livres tournois)	Intern. Consumption Productive Class	Intern. Consumption Sterile Class	Final Consumption Wage-earners (a)			Final Consumption Farmers (b)	Investment in original advances. Farmers (c)	Final Uses of Productive Class (a + b + c)	Final Consumption Sterile Class	Final Consumption Proprietors	Total Final Uses	Total Uses
Productive Class	900	1,545.2	949.4	249	951	2,149.4	772.6	1,000	3,922	6,367.2		
Sterile Class	0	0	921.6	289.2	106	1,316.8	772.6	1,001	3,090.4	3,090.4		
Total	900	1,545.2	1,871	538.2	1,057	3,466.2	1,545.2	2,001	7,012.4	9,457.6		
Value Added	5,467.2	1,545.2										
<i>Net product</i>	2001											
<i>Interests (CFC)</i>	1057											
<i>Remuner. farmers</i>	538,2											
<i>Salaries</i>	1871	1545.2										
Total Resources	6,367.2	3,090.4										

Table 5: Input-Output Table of the French economy (developed system of accounts)

Based on table 6, table 7 is an input-output table corresponding to the *Grand Tableau*. The agricultural sector has no intermediate consumptions anymore. The agricultural added value breaks down into salaries (1,550), remunerations (450), consumption of fixed capital (CFC, 1,000), and net product (2,000). The uses of agriculture are intermediate consumptions of industry (1,000) and final uses of

²¹ The consumptions of industrial products are deducted by subtraction. For example, the industrial consumption of the wage-earners is 921.6, total consumption (1,871) less agricultural consumption (949.4). We suppose that the sterile class has an industrial final consumption (772.6) equal to its agricultural final consumption (772.6).

²² We obtain these figures by taking in table 3 the proportion of salaries (77.6%) and remunerations (22.4%) in the total (salaries + remunerations), and we round slightly.

4,000 (2,000²³ for the productive class and 1,000 for each of the two other classes). The resources of the sterile class (2,000) are its own labour (1,000) and agricultural intermediate consumptions (1,000). The sterile class has total uses of 2,000, delivered to the proprietors (1,000) and to the productive class (1,000). The final consumption of the sterile class in agricultural products is of 1,000. Its final consumption of industrial products is not included in table 7 (and in the *Grand Tableau*)²⁴. Industry does not create net product²⁵: the value of its work equals the cost of the raw materials plus the cost of the subsistances of its members. The industrial products delivered by the sterile class to the productive class (1,000) concern the investment of the farmers (100), and the final consumption of the farmers (225) and of the agricultural wage-earners (675).

	Sectors I to V	Livestock S-VI	Rural Trade (S-VII)	Figures taken up in the <i>Grand Tableau</i>
Interm. Consumptions	0	600	300	0
Salaries of wage-earners	1,471	300	100	2,000 (Salaries: 1,550, Remunerations: 450)
Remunerations of Farmers	418.2	0	120	
Interests of Farmers	817	0	240	1,000
Net Product	2,001	0	0	2,000
Gross Production	4,707.2	900	760	5,000

Table 6: The accounts of agriculture (reduced system of accounts)

If we compare Quesnay's accounting (focused on net product) to national accounting (focused on value added), we see in table 7 that:

- the gross value added (GVA) of agriculture (5,000) includes three elements: a net product (2,000, net operating surplus (NOS)), an interest (1,000), and salaries and remunerations (2,000). If the interests are completely used for consumption of fixed capital (CFC), as it is the case in table 7, we can write:

$$\text{GVA (5,000)} = \text{NOS (2,000)} + \text{CFC (1,000)} + (\text{Salaries and Remunerations}) (2,000).$$

- the gross value added of industry (1,000) corresponds to the salaries of the members of the sterile class. The net operating surplus of industry is null. Industry is "sterile" in terms of net product, as it does not create net product. It is not "sterile" in terms of value added.

- the gross value added of the economy is 6,000, net operating surplus (2,000), consumption of fixed capital (1,000), salaries and remunerations (3,000). The total resources of the economy are 7,000, gross value added (6,000) and intermediate consumptions (1,000).

²³ The final consumption in industrial products of the productive class, which amounts to 900 (2,000 – 1,000 – 100), may be divided in different ways between the farmers and the wage-earners: we choose 675 for the wage-earners and 225 for the farmers. The farmers are 5 times less numerous than the wage-earners but have a higher standard of living.

²⁴ The final consumption in agricultural products of the sterile class has increased from 772.6 to 1,000, passing from table 5 to table 7. The sterile class uses 227.4 of agricultural raw materials (1,000 – 772.6) to elaborate industrial products for itself, that are now final consumptions (and no more intermediate consumptions).

N. Baudeau (1776: 150-151) explains differently how the sterile class obtains agricultural raw materials for its own industrial products. He affirms that the sterile class makes a profit during the exchange, which does not correspond to the physiocratic theory. The presentation of the *Tableau* by Baudeau is a simplified one, for an educated person as *Madame de ****. *Philosophie rurale* is, at a higher level, "a fundamental book for the statesmen and the citizens" ["un ouvrage fondamental pour les hommes d'Etat et les Citoyens"] (Mirabeau and Quesnay 1767: cv).

²⁵ With annual advances of 2,000, the productive class produces 5,000. Agriculture reproduces 5 for 2 of annual advances, "the annual advances reproduce two hundred fifty per cent" [*les avances annuelles reproduisent deux cents cinquante pour cent*] (Quesnay 2005: 548). Industry reproduces 1 for 1, its labour of 1,000 reproduces 1,000.

- the share of salaries and remunerations in the gross value added is of 40% for agriculture (2,000/5,000) and of 50% in the whole economy. This last figure is a little weaker as it is the case today in European economies (60-70%).

(unit: Millions of livres tournois)	Intermed. Productive Consumption Class	Intermed. Sterile Consumption Class	<i>Final Consumption of the Wage-earners (a)</i>			<i>Final Consumption of the Farmers (b)</i>	<i>Investment in original advances of Farmers (c)</i>	Final Consumption Sterile Class	Final Consumption Proprietors	Total Final Uses	Total Uses
			875	225	900						
Productive Class	0	1,000	875	225	900	2,000	1,000	1,000	4,000	5,000	
Sterile Class	0	0	675	225	100	1,000	/	1,000	2,000	2,000	
Total	0	1,000	1,550	450	1,000	3,000	1,000	2,000	6,000	7,000	
Value Added	5,000	1,000									
<i>Net Product</i>	2,000										
<i>Interests (CFC)</i>	1,000										
<i>Remunerat. of Farmers</i>	450										
<i>Salaries</i>	1,550	1,000									
Total Resources	5,000	2,000									

Table 7: Input-output table relative to the *Grand Tableau* (agricultural gross product of 5,000)

In the *Grand Tableau* (table 7), the authors distinguish two categories of activities: the agricultural production giving net product and the industrial production for the proprietors and the productive class, without net product. Table 5, which takes into consideration the whole uses and resources of the economy, adds two other categories of production, which do not appear in the *Grand Tableau*: an agricultural production without net product (sectors VI and VII of table 3), and an industrial production for the members of the sterile class.

3. *Grand Tableau* and double-entry accountings

3.1 Problematic, progress of the year and structure of advances

How do the exchanges take place during the year? Do the purchasers have at their disposal enough money to pay? Do the sellers have the available products? Time plays an important role in Quesnay's economy (Schumpeter 1954: 238-243; Eltis 1998), but this point does not appear in an input-output table (Le Masne 2016). We describe the exchanges during the year under the form of three double-entry accountings, in order to better understand.

Schmalz (1826 [1808]) produced a double-entry accounting relative to the *Tableau*. But this sole accounting does not allow us to understand the detailed relations between the three classes. We give 3

accountings (proprietors, sterile class, farmers) which may be read simultaneously in a general equilibrium logic. Schmalz's attempt interested Marx, who wrote on that subject to his friend Engels:²⁶ "A propos! If it can be done in all briefness, without making heavy demands on you, I would wish a paradigm (plus an explanation) of Italian book-keeping. It would be useful in the illumination of the "Tableau Economique" of D^r Quesnay". Marx did not carry out his idea, but he understood the interest of double-entry accounting to shed light on the *Tableau*.

The timespan of the three accountings is an agricultural year beginning on November 1 and ending on October 31. Besides, during the 18th century in France the fiscal year was beginning on November 1 (Touzery 1994: 117).

Money supply, called in table 2 "argent du revenu" (money of income) and sometimes "pécule" (nest egg) is of 2,000. The "pécule" is equal to the net product (PR 1763: 396; 2014: 666): an amount greater than net product is not necessary.²⁷

What is the composition of the sterile advances (1,000): money, finished products, subsistences or agricultural raw-materials? As table 2 indicates that the money supply is 2,000, which is used in order to pay the leases, sterile advances do not include money. *Philosophie rurale* (PR 1763: 406; 2014: 681) specifies that annual sterile advances are a "heap of commodities that the sterile class has to work and worked merchandises, and the prior expenditure of subsistences before remuneration".²⁸ We assume that the sterile advances consist on November 1 of subsistences (250 (3 months of final consumption)), of agricultural raw materials (250 (3 months of stock)) and of finished products (500 (3 months of stock))²⁹.

When are the leases paid to the proprietor? It is usually supposed that the farmers pay 2,000 at the beginning of the economic year, at one time: in the *Grand Tableau*, a line connects the net product of the farmers (2,000) to the income of the proprietors (2,000). In fact, the reason is not economic but related the presentation of the *Tableau*, which Quesnay wants as simple as possible. We will stick for the moment to this presentation and will suppose that the leases are payed at one time at the beginning of the year; we will reconsider this assumption later.

The previous assumption introduces a monetary constraint. At the beginning of the year, the farmers hold the whole money supply, and the proprietors and the sterile class have no liquidity. When the farmers have paid the farm-rent, the productive class and the sterile class have no more liquidity, and the proprietors dispose of the whole "pécule".

In the first days of November, the proprietors receive the farm rent (2,000). From the beginning of November, proprietors buy agricultural products from the farmers and industrial products from the artisans, on various markets, 83.33 each month: it means during the whole year 1,000 to the farmers and 1,000 to the artisans. These sales constitute receipts for the two active classes and allow to them to exchange. The farmers pay the wage-earners, which buy subsistences (and finished products)³⁰; the farmers receive remunerations. As soon as they sell finished products, the artisans can buy new subsistences and they live no longer on their subsistence stocks.

In summer, wheat is harvested. The grape harvest takes place next. The whole harvest, stored at the end of October, has a market value of 5,000 (*livres*).

²⁶ Letter from Marx to Engels from 18 June 1862, Marx-Engels (1964, MEW 30: 249).

²⁷ The equality of the "pécule" with the net product is already stated in the *Tableau Economique avec ses explications* (Quesnay 2005: 496).

²⁸ "amas de denrées qu'elle [la classe stérile] doit ouvrir et des marchandises ouvrées, et la dépense préalable de subsistance qui précède la rétribution".

²⁹ Other amounts are possible.

³⁰ It is possible to suppose that the wage-earners are payed on a daily basis.

The three accountings are given successively, with, for each, the names of the accounts and the General Journal. The stocks are computed with the periodic inventory method; stocks inventory is made at the beginning of the year and at the end of the year, but stock accounts are not modified during the year. The purchases of the members of the productive and of the sterile class on various markets are not registered in the General Journal of farmers and artisans. The purchases of the proprietors are registered into the General Journal: their economic activity consists in consuming. For the farmers, we write on the right side of the General Journal the stock available after the operations, and the cash balance.

3.2 Proprietors and artisans

Proprietors dispose of three accounts: Cash, Purchases, Farm-rent revenues. On November 1, their Cash balance is null.³¹ In the first days of November, the farm-rent (2,000) is paid by the farmers to the proprietors.³² The proprietors buy regularly from November agricultural products, 83.33 each month, 1,000 for the whole year. They buy also from November industrial products to the artisans, 83.33 each month, 1,000 for the whole year. After these 2,000 purchases, the Cash balance of the proprietors is brought back to zero.

N°	Period	General Journal of the proprietors	D	C
1	First days of November	Cash Farm-rent revenues <i>Cashing of the farm-rents</i>	2,000	2,000
2	November to October	Purchases Cash <i>Agricultural products purchases (83.33 each month)</i>	1,000	1,000
3	November to October	Purchases Cash <i>Finished products purchases (83.33 each month)</i>	1,000	1,000
		Total General Journal	4,000	4,000

Table 8: General Journal of the proprietors (relative to the *Tableau*)

The artisans dispose of 7 accounts: Capital stock, Cash, Agricultural products stock, Finished products stock, Agricultural products purchases, Wages paid, Sales of finished products. The balance sheet of the artisans on November 1 is given in table 9.

Assets		Liabilities and shareholder's equity	
Agricultural products stock (subsistences 250, raw materials 250)	500	Capital stock	1,000
Finished products stock	500		
Cash	0		
Total	1,000	Total	1,000

Table 9: Balance sheet of the artisans on November 1

³¹ We describe only the part of the economy correspondig to table 7. Proprietors dispose of other riches which do not intervene in the exchanges. These other riches are described in Quesnay (2005: 416-419) or in the *Tableau Économique avec ses explications* (Quesnay 2005: 469-471), but not in *Philosophie rurale*. Concerning these riches, *Philosophie rurale* (PR 1763: 387; 2014: 653) refers nevertheless to the *Tableau Économique avec ses explications*.

³² This income concerns the previous year. It would be possible to note it in the accountancy with income accounts of the previous year, with a lot of complications in the presentation. We treat it as an income of the year, payed at the beginning of the year. Economically, it does not modify the situation as the farm-rent remains unchanged year after year.

The artisans sell, on various markets, finished products to the proprietors, 83.33 each month, 1,000 for the year. The artisans sell also to the members of the productive class, 83.33 each month, 1,000 for the year (900 for final consumption and 100 for investment). The total of their sales is 2,000, 166.67 each month (table 10). The artisans pay salaries, 83.33 each month, 1,000 for the year. The replacement of the agricultural raw materials leads also to purchase 83.34 each month, 1,000 for the year. The artisans cash 166.67 each month and disburse the same amount. Their Cash balance is null at the end of each month and at the end of the year.

N°	Period	General Journal of the artisans	D	C
1	November to October	Sales of finished products Cash <i>Sales of finished products (166.67 each month)</i>	2,000	2,000
2	November to October	Wages paid Cash <i>Payement of wage-earners and artisans (83.33 each month)</i>	1,000	1,000
3	November to October	Purchases of agricultural products Cash <i>Purchases of raw materials (83.34 each month)</i>	1,000	1,000
4	31/10	Sales of finished products Agricultural products stock Finished products stock Purchases of agricultural products <i>Inventory adjustment</i>	2,000	500 500 1,000
		Total Journal	6,000	6,000

Table 10: General Journal of the artisans relative to the *Tableau*

3.3 Farmers

The farmers dispose of eight accounts: Capital stock, Fixed assets (material, livestock, raw materials kept one year or more), Stock of agricultural products, Cash, Wages and remunerations paid, Farm-rent expenses, Depreciation expenses, Sales of agriculture products. The balance sheet of the farmers on November 1 is given in Table 11. The farmers have 10,000 fixed assets (original advances), a stock of 5,000 agriculture products, and 2,000 in cash (annual advances). The total assets are 17,000, corresponding to 10,000 original advances (not given in the *Tableau* but which exist besides) and to 7,000 exploitation riches.³³

Assets		Liabilities and shareholder's equity	
Fixed assets (material, cattle, raw materials)	10,000	Capital stock	17,000
Stock of agricultural products	5,000		
Cash	2,000		
Total	17,000	Total	17,000

Table 11: Balance sheet of the farmers (November 1)

The farmers pay in the first days of November a 2,000 farm-rent to the proprietors (table 12). They sell regularly subsistence goods to the proprietors (1,000 during the year), to the members of the sterile class (1,000), and to the artisans as raw materials (1,000), in total 3,000 during the year, 250 each month. These receipts allow to pay from November salaries and remunerations, 166.67 each month, 2,000 for the year. The farmers and wage-earners buy each month agricultural products (91.67) for their own final consumption, 1,100 for the whole year. The farmers buy industrial equipments from the artisans, 8.33

³³ These 7,000 exploitation riches constitute, with the 1,000 sterile advances, the 8,000 "Mass of the riches contained in the *Tableau*" (see table 2).

each month, 100 for the year. The receipts of the farmers are of 341.67 (250 + 91.67) each month, their payments of 175 (166.67 + 8.33): their cash balance increases of 166.67 (341.67 – 175) each month. After 12 months, they have regained their initial cash, with an amount of 2,000, and will be able to pay the farm-rent of the following year.

N°	Period	General Journal of the farmers	D	C	Cash Balan -ce	Stock Agri. Prod.
1	First days of November	Farm-rent expenses Cash <i>Payment of farm rent</i>	2,000	2,000	0	5,000
2	November to October	Cash Sales of agricul. products <i>Sales AP (proprietors and sterile class, 250 each month)</i>	3,000	3,000	/	2,000
3	November to October	Wages and Remunerations paid Cash <i>Payment of wages and remuner. (166.67 each month)</i>	2,000	2,000	/	2,000
4	November to October	Cash Sales of agricul. products <i>Sales to farmers and wage-earners</i>	1,100	1,100	/	900
5	November to October	Fixed assets Cash <i>Increase Fixed assets (FP)</i>	100	100	/	2,000
6	November to October	Fixed assets Stock agricultural products <i>Increase Fixed assets (AP)</i>	900	900	/	0
7	31/10	Depreciation expenses Fixed assets <i>Depreciation expenses</i>	1,000	1,000	2,000	0
8	31/10	Stock agricultural products Sales agricultural products Stock agricultural products <i>Inventory adjustment</i>	5,000	900 4,100	2,000	5,000
		Total General Journal	15,100	15,100		

Table 12: General Journal of the farmers relative to the *Tableau*

An investment of 1,000 takes place during the year, in agriculture products (900, AP)³⁴, and in finished products (100, FP). On October 31, a 1,000 depreciation expense of fixed assets is registered.³⁵ An inventory shows that the stock of agricultural products is always 5,000, as the stocked production of the preceding year has been exhausted; an adjustment-entry is written in the General Journal. The balance sheet after inventory on October 31 is identical to the balance sheet on November 1.

The exchanges can take place on the basis of Quesnay's assumptions. They have however to be regular, and monetary tensions appear at the beginning of the year. The members of the productive class may

³⁴ A part of the agricultural production of the year becomes an investment (for example horses born during the year), without intervention of the Cash account. It does not mean that each farmer invest his own production. They may buy between them horses and these operations do not appear in an aggregated accounting.

³⁵ In order to simplify the entries, we do not utilise the count "Allowance for depreciation".

have difficulties disposing of the necessary liquidities for their purchases. These difficulties would be suppressed if farm-rent was paid at several times, the farmers paying a part of the leases later, for example at the end of December, and retaining liquidities during two months.

3.4 Complementary remarks

We assumed a payment of the farm-rent at one time, on the basis of the *Grand Tableau*. The authors of *Philosophie rurale* absolve themselves sometimes of that presentation. On one hand, they affirm that the zig-zag *Tableau* is a presentation trick (PR 1763: 43; 2014: 132)³⁶: “..what appears here gradual and go by steps, is only a fictional order of clarification, necessary in order to present on a regular and fixed aspect the decisive results of the real order, which is free and confused”. On the other hand, exchanges can take place differently from the presentation of the *Tableau*. Instead starting from the expenses of the farm-rent paid by the farmers to the proprietors, the circuit may be launched by the expenses of a part of the annual advances of the farmers, the proprietors receiving later in the year (and at different times) the farm-rent (PR 1763: 215-215; 2014: 391). If the farm-rent is paid in two or more times, the farmers keep liquidities at the beginning of the year in order to pay salaries and remunerations, and in order to buy finished products from the artisans: the monetary constraints disappear.

We have supposed, in order to simplify, that the interests, 10% of the original advances, were entirely used to maintain these original advances. Mirabeau, Quesnay and Butré (PR 1763: 139-140; 2014: 280) suppose in reality a maintenance of advances on a basis of 5%, the other 5% being used in particular for casual losses. But without casual loss, the other 5% increase the original advances. The interest of the farmer is also the opportunity for him to increase his original advances and his capital, as noted by Marx (1972: 235). We enter then into a logic of growth, developed in chapter IX of *Philosophie rurale*.

We have described under the form of three accountings the exchanges of table 7 (with agricultural resources of 5,000). The exchanges of table 5 (with agricultural resources of 6,367.2) could be described in the same way.

Conclusion

Philosophie rurale was written two and half centuries ago, at a time when national accounting did not exist. In *Éléments de la Philosophie rurale*, Mirabeau and Quesnay (1767 : cijj-cv) admit that *Philosophie rurale* presents defects. An example of these defects is the composition of the sterile advances, which are defined in two different ways at the beginning and at the end of the book. *Philosophie rurale* (PR 1763: 406; 2014: 681) specifies at the end of the book, as already said, that annual sterile advances are a “*heap of commodities that the sterile class has to work and worked merchandises, and the prior expenditure of subsistences before remuneration*”. But *Philosophie rurale* (PR 1763: 33; 2014: 115) affirms beforehand that sterile advances are “*a heap of commodities that the sterile class has to work and worked merchandises*”, and does not speak of “*the the prior expenditure of subsistences before remuneration*”. We have chosen the definition at the end of the book, which is an improvement on the other definition: the sterile class needs subsistences to live on before selling industrial products, and the definition at the beginning of the book is not aware of this problem. Other analysts could have chosen the definition at the beginning of the book: they could affirm that Quesnay does not understand the necessity of subsistences for the sterile class. We have adopted a comprehensive attitude which does not insist on the defects of *Philosophie rurale*, and which tries to understand its general logic.

³⁶ “ ..ce qui paroît ici graduel et marcher par échelons, n'est qu'un ordre fictif et de débrouillement, qui étoit nécessaire pour présenter, sous un aspect régulier et fixe les résultats décisifs de l'ordre réel, libre et confus ”.

Although imperfect, *Philosophie rurale* gives the sole complete presentation of the physiocratic system and of the *Tableau*. Quesnay's *Tableau* is connected in *Philosophie rurale* to detailed accounts of agriculture. The *Grand Tableau* derives from these accounts, which can be transposed in the form of input-output tables or of double-entry accountings. The three classes have access to agricultural and industrial products, in a monetary and market economy. Precise relations may be established between Quesnay's concepts and the concepts of national accounting.

It is possible to criticize Quesnay's manner of treating specific questions, as intermediate consumptions. But it is not serious to assert that *Philosophie rurale* is an inconsistent work. The *Tableau* was constantly improved from 1758 to 1767-68 and the analysis of economic circuit makes important progress with Quesnay.

Quesnay's *Tableau* prefigures a lot of modern analyses, among which are Leontief's models (Leontief 1941, 1953). Before it, Quesnay influenced Marx (Schumpeter 1954: 238), who gives his own version of the *Tableau*³⁷. Quesnay's *Tableau* influenced also Piero Sraffa (1960: 93) and growth models of Harrod or Domar type (Eltis 1998). Quesnay understands the imbalances provoked by money inside the economic circuit and many authors after him were preoccupied by these imbalances (Hunt 1979).

Because of the influence of Quesnay's *Tableau* on several parts and currents of economics, an economist should understand the detail of interests and limits.

References

- Barna, T. (1975). Quesnay's *Tableau* in modern Guise. *The Economic Journal*, 85: 485-496.
- Baudeau, N. (1776). *Explication du Tableau Economique à Madame de N****. Paris: Delalain.
- Blaug, M. (1973). *Economic Theory in Retrospect*. (Second Edition). London: Heineman.
- Butré, C. [Richard de]. (1781). *Loix naturelles de l'agriculture et de l'ordre social*. Neuchatel: Société typographique.
- Denis, H. (1999). *Histoire de la pensée économique*. Paris: PUF.
- Dupuy, R., Le Masne, P. (2014). Présentation de la *Philosophie rurale*. In Mirabeau, Quesnay, Butré, *Philosophie rurale*, 9-35.
- Eltis, W. (1996). The *Grand Tableau* of François Quesnay's economics. *The European Journal of the History of Economic Thought*, 3: 21-43.
- Eltis, W. (1998). The Harrod-Domar equation from Quesnay to Marx to Harrod and Domar. In G. Rampa, L. Stella, A. Thirlwall (eds.), *Economic Dynamics, Trade and Growth: Essays on Harrodian Themes*, London: MacMillan.
- Gehrke, C. and Kurz, H. (1995), Karl Marx on Physiocracy. *The European Journal of the History of Economic Thought*, 2: 53-90.
- Gray, A. (1931). *The Development of Economic Doctrines*. London: Longman.
- Herlitz, L. (1961). The *Tableau économique* and the Doctrine of Sterility. *Scandinavian Economic History Review*, 9: 121-150.
- Herlitz, L. (1996). From spending and reproduction to circuit flow and equilibrium: the two conceptions of *Tableau économique*. *The European Journal of the History of Economic Thought*, 3: 1-20.
- Hunt, E. K. (1979). *History of Economic Thought: A Critical perspective*. Belmont: Wadsworth.
- Le Masne, P. (2016). *Tableau de Quesnay et Tableau de Leontief*. *Cahiers d'Économie politique*, 71: 31-64.
- Le Masne P., Le Masne C. (2014). Charles Richard de Butré, un physiocrate originaire du Poitou, *Revue historique du Centre-Ouest*, n° 1, p. 7-37.
- Leontief, W. (1941). *The Structure of the American Economy 1919-1929*. Cambridge: Harvard University Press.

³⁷ Letter of Marx to Engels from 6 July 1863 (Marx and Engels 1964; Gehrke and Kurz 1995).

- Leontief, W. (1953). Dynamic analysis. In *Studies in the Structure of the American Economy*, W. Leontief (ed.). New-York: Oxford University Press, 53-90.
- Marx, K. and Engels, F. (1964). *Briefwechsel zwischen Marx und Engels Januar 1860-September 1864*. Marx-Engels-Werke, vol. 30. Berlin: Karl Dietz Verlag.
- Marx, K. (1972). Aus der kritischen Geschichte. In *Anti-Dühring*, ch. X, F. Engels (ed.). Marx-Engels Werke, vol. 20. Berlin: Karl Dietz Verlag, 210-238.
- Marx, K. (2000). *Theorien über den Mehrwert*. Marx-Engels Werke, vol. 26.1. Berlin: Karl Dietz Verlag.
- Meek, R. (1963). *The Economics of Physiocracy*. Cambridge: Harvard University Press.
- Milanovic, B. (2015). The Level and Distribution of Income in Mid-Eighteenth-Century France according to François Quesnay. *Journal of the History of Economic Thought*, 31 (1): 17-37.
- Mirabeau [Riqueti V., marquis de]. (1760). *L'Ami des hommes*. 3 vol., in-4to. Avignon.
- Mirabeau [Riqueti V., marquis de], Quesnay F. (1760). *Théorie de l'impôt*, in-4to.
- Mirabeau [Riqueti V., marquis de], Quesnay, F. (1767). *Éléments de la Philosophie rurale*. La Haye: Les Libraires associés.
- Mirabeau [Riqueti V., marquis de], Quesnay, F. and Butré C. [Richard de]. (1763). *Philosophie rurale ou Economie générale et politique, de l'agriculture*. Amsterdam: Les Libraires associés.
- Mirabeau [Riqueti V., marquis de], Quesnay, F. and Butré C. [Richard de]. (2014). *Philosophie rurale ou Economie générale et politique, de l'agriculture*. Reedition of the 1763 edition by R. Dupuy and P. Le Masne. Geneva: Slatkine.
- Moriceau, J.-M. (1994). *Les fermiers de l'Île-de-France*. Paris: Fayard.
- Philipps, A. (1955). The Tableau Economique as a Simple Leontief Model, *Quarterly Journal of Economics*, 69: 137-144.
- Quesnay, F. (1767-68). *Physiocratie, ou constitution naturelle du gouvernement le plus avantageux au genre humain*. 2 vol., P.-S. Du Pont (ed.). Leyde and Paris: Merlin.
- Quesnay, F. (1958). *François Quesnay et la Physiocratie*, t. 1. Paris: INED.
- Quesnay, F. (2005). *Œuvres Économiques complètes et autres textes*. C. Théré, L. Charles and J.-C. Perrot (eds). Paris: INED.
- Sabbagh, G. (2015). The Philosophie rurale of Quesnay, Mirabeau, and Butré, after 250 years. *Contributions to Political Economy*, 34: 105-124.
- Samuelson, P. (1982). Quesnay's 'Tableau Economique' as a Theorist would formulate it today, in I. Bradley and M. Howard (eds.), *Classical Marxian Political economy*, London: McMillan, 48-78.
- Schmalz, T. (1826 [1808]). *Economie Politique*. Translation by H. Jouffroy. Paris: Arthus Bertrand.
- Schumpeter, J. (1954). *History of Economic Analysis*. London: George Allen and Unwin.
- Smith, A. (1976 [1776]). *An Inquiry into the Nature and Causes of the Wealth of Nation*. R. H. Campbbell and A. S. Skinner editors. Vol. 1. Oxford: Clarendon Press.
- Sraffa, P. (1960). *Production of Commodities by Means of Commodities*. Cambridge University Press.
- Steiner, P. (1992). L'économie politique du royaume agricole. François Quesnay. In *Nouvelle histoire de la pensée économique*, t. 1, A. Béraud and G. Faccarello (eds.). Paris: La Découverte, 225-253.
- Théré, C. and Charles, L. (2008). The Writing Workshop of François Quesnay and the Making of Physiocracy. *History of Political Economy*, 40: 1-42.
- Touzery, M. (1994). *L'invention de l'impôt sur le revenu : la taille tarifée 1715-1789*. Paris: Ministère de l'Économie.
- Walras, L. (1988). *Éléments d'Économie politique pure*. Paris: Economica.

Acknowledgements

The authors thank Gabriel Sabbagh (University of Paris-Diderot), Séverine Sudron and Jean-Pierre Tisseur (University of Poitiers). We remain alone responsible of the content of this article.

Abstract

We show that the Quesnay's *Tableau*, as it appears in *Philosophie rurale* (1763), is an understandable, robust and innovative construction, in spite of detail errors. It gives a detailed representation of the economic circuit. The accounts of chapter VII of *Philosophie rurale* are introduced and we explain how the Quesnay's *Tableau* comes from these accounts. The transposition of the accounts of chapter VII and of the *Tableau* into two input-output tables shows the balance of resources and uses. In order to shed light on the progress of exchanges during the year, the *Tableau* is also transposed into the form of three double-entry accountings (proprietors, farmers and artisans).

Keywords

Quesnay's *Tableau*, Physiocracy, National accounting, Double-entry accounting, Intermediate consumption.

JEL Codes

B 110, N5.

Preprint