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**PERFORMANCE MEASUREMENT IN JULIUSZ AU'S THEORY
OF AGRICULTURAL ACCOUNTING IN 19th CENTURY POLAND****

Abstract. Before the Partitions, Poland, beside Russia, was the largest, territorially compact European state. As a result of the Partitions of Poland, which were carried out in 1772, 1793 and 1795, Polish territory was divided and annexed by the three partitioning powers: Russia, Germany and Prussia. In an attempt to resist aggressive Germanization by the invader, Poles employed, among others, the methods of “organic work” and “work at the grass roots” (a programme, launched by the Polish positivists, of economic and cultural development through spreading literacy and popularizing science among the masses). It was on Polish territories under Prussian occupation that the theoretical and practical foundations of farm accounting were developed (Bernacki 2007b, p. 116-117). The main objectives of this paper are: to place the work and theory of Juliusz Au within the social and political context of the Prussian partition; to present a theory of agricultural accounting developed by J. Au; to evaluate J. Au's theory from present-day perspective.

J. Au is the author of a comprehensive, universal theory of accounting encompassing its three cognitive levels (aspects): (1) general level, covering the concept, objectives and method of accounting; (2) procedural level, comprising principles of assets measurement, choice of accounting period and production cost calculation; (3) supporting level, comprising organization of accounting, rules for statistical data collection and audit procedures.

Keywords: accounting history, 19th century Poland, accounting theory, agriculture.

*It is in accounting theory, more than anywhere else,
that the need exists to clarify the simplest matters
that were made complicated by pseudo-scientists.*

J. Au, 1889

1. INTRODUCTION

Before the Partitions, Poland, beside Russia, was the largest, territorially compact European state. In the 18th century, Poland suffered from deep social and political crisis, which was an indirect cause of the Partitions. Other impor-

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tant factors which led to Poland's temporary disappearance from the map of Europe included aggressive policy of the neighboring countries and economic attractiveness of Polish lands (Korobowicz, Witkowski, 2009, p. 13-14). As a result of the Partitions of Poland, which were carried out in 1772, 1793 and 1795, Polish territory was divided and annexed by the three partitioning powers: Russia, Germany and Prussia. The Prussian partition comprised three provinces: West Prussia with the city of Toruń, South Prussia: Poznańskie, Kaliskie and part of Mazovia with Warsaw, and New East Prussia: territories north of the Bug and Vistula rivers (Zdrada, 2005, p. 16-17). In an attempt to resist aggressive Germanization by the invader, Poles employed, among others, the methods of "organic work" and "work at the grass roots" (a programme, launched by the Polish positivists, of economic and cultural development through spreading literacy and popularizing science among the masses). It was on Polish territories under Prussian occupation that the theoretical and practical foundations of farm accounting were developed (Bernacki 2007b, p. 116-117).

The main objectives of this paper are: to place the work and theory of Juliusz Au within the social and political context of the Prussian partition; to present a theory of agricultural accounting developed by J. Au, with a particular focus on the social and financial context of performance measurement; to evaluate J. Au's theory from present-day perspective.

The author's theses are as follows:

- the spreading of agricultural accounting knowledge in the Prussian partition was an element of the "grass-roots work";
- the banning of agricultural accounting education by Prussian authorities was an element of *Kulturkampf*;
- the main ideas of J. Au's theory are present in current accounting regulations (Accounting Act, FADN system, IAS 41 *Agriculture*).

As far as the author of this paper knows, J. Au's conception of agricultural accounting has not been the subject of detailed studies published in accounting literature in the post-war period. Its importance, however, was pointed out by S. Moszczeński (1947, p. 22-23), who was the first to refer to it as theory and to emphasize J. Au's scientific approach to accounting for agricultural activity. J. Au's social, professional and scientific achievements were also recognized by A. Bernacki, who referred to his contribution in many of his publications (Bernacki, 2007a, b).

Accounting history has a long tradition, but in recent years it has concentrated its endeavours to expand research enquiries and methodological approaches. It seeks to understand accounting's past by investigating the development of accounting through the consideration of its international dimensions and in light of a wide range of contemporary social and political theories and aspects (see Napier, 1989, p. 237-254; 2006, p. 445-507; Carnegie,

Napier, 1996, p. 7-39; 2002, p. 689-718; Carnegie, Rodrigues, 2007, p. 441-464). At the same time the accounting historians indicate a need for further research by scientists outside the field of Anglo Saxon (Carmona, 2004, p. 7-23; Walker, 2005, p. 233-259).

2. ORGANIC WORK AS A MAJOR NATIONAL TASK IN THE SOCIAL AND POLITICAL SITUATION IN THE PRUSSIAN PARTITION

German expansion was a dangerous challenge for the Polish nation. To deal with it, a programme of organic work in the field of the economy, education, culture and social organization was developed and adopted as the main weapon in resisting Germanization. Maintaining Polish ownership of land was considered as the main priority. It required modernization of farm management in landed estates, which were mostly in poor condition, and improvement of peasant farming. A number of associations was established to support modernization of manorial and peasant farming practices, such as the Industrial Society in Poznań headed by Hipolit Cegielski, Central Economic Society in Great Poland (west-central part of Poland), and Polish Agronomic Society in West Prussia, which coordinated the activities of local associations (Zdrada, 2005, p. 570). Numerous agricultural exhibitions and demonstration [Landowner] – organ of the Central Economic Society. At the initiative of J. Au an agricultural school was founded in the village of Żabikowo near Poznań (Kozłowski, 2006, p. 180). Extensive educational work was conducted among the peasant population. Farmers associations, promoted and supported by the Central Economic Society, were proliferating. They had a significant impact on improving the quality of agricultural production and farm management practices. Farmers associations were organizations allowed by law, but nevertheless they were viewed with suspicion by Prussian authorities, which knew that they were bastions of Polish resistance.

Otto von Bismarck, Chancellor of the German Empire, waged ruthless war against his opponents, among whom he included Poles and all Catholics. The war with the Catholic Church that he instigated was in Great Poland a method of preventing the influence of Polish clergy and gentry on the people. As part of Bismarck's *Kulturkampf*, Polish language was banned from public life and was replaced by German. Among numerous repressive measures involved in Germanisation was closure of the Higher School of Agriculture founded by the Central Economic Society.

3. JULIUSZ AU – A BIOGRAPHICAL NOTE

Juliusz Au was born in 1842 in Poznań and died in Dublany near Lvov. He studied in Heidelberg, Hohenheim and the Agricultural Academy Popelsdorf, where he received the title of associate professor for a thesis on mineral fertilizers.¹

He launched an initiative, in cooperation with the Central Economic Society, to establish an agricultural school in the village of Żabikowo near Poznań. It was founded by an eminent scholar and activist, August Cieszkowski,² who named it, after his dead wife, the Halina Higher School of Agriculture,³ and donated his manor farm for the purposes of agricultural education. The school, which was at that time the only higher education institution in the Prussian partition, started operation on 21 November 1870⁴ (Bernacki, 2007a, p. 7; Kozłowski, 2006, p. 181). Its building, now of historical value, is situated in the old part of the town of Luboń.

J. Au was the headmaster of this educational establishment for six years, until it was closed down by the Prussian government. In 1876 he became the headmaster of the Higher School of Agriculture in Dublany near Lvov, taken over by the Galician National Department. He held this position until the end of his life (Bernacki, 2007a, p. 7).

J. Au was very active, both professionally and in the field of social work. He was a co-organizer, among others, of the Central Economic Society in Poznań, the Galician Economic Society in Lvov, and the Rhone Country Economic Society. His major publications include *History and organization of the Higher School of Agriculture in Dublany* [Yearbooks of the National Higher School of Agriculture, vol. I, 1888], a chapter in Vol. V of *Encyklopedia rolnictwa* of 1879, containing information on experimental stations conducting research in farming, forestry and technology, numerous articles in *Ziemiańin*, *Gazeta Rolna* and *Rolnik Lwowski*, and, first of all, a manuscript devoted to agricultural accounting. It was published after J. Au's death by his pupils, under the title *Nauka rachunkowości do potrzeb gospodarstwa wiejskiego zastosowanej* [Accounting for farm management purposes] (1889). J. Au's private book collection with

¹ In a thesis entitled "J.v. Liebig's Lehre von der Bodenerschöpfung und die national oekonomischen Bevölkerungstheorien dargestellt und kritischgeprüft" (1869) he discussed the question of returning to soil the mineral elements used by plants (Dembiński, 1970, p. 9-31).

² It was the wish of August Cieszkowski that the school be named Halina, after his deceased wife.

³ August Cieszkowski – studied at Jagiellonian University, received the title of Doctor of Philosophy from the University of Heidelberg; one of the founders of the Polish League and the Poznań Scientific Society; philosopher, economist and social activist; a proponent of action as the main principle of existence and history, he invested it with moral and religious connotation on the basis of Christian principles, with reference to the Slavik issue and Polish cause.

⁴ Owing to the staff and the research and teaching achievements of the Higher School of Agriculture in Żabikowo, the Faculty of Agriculture and Forestry was formed as one of the first faculties of the University of Poznań, founded in 1919.

thousands of volumes on the subject of economy was donated to the National Higher School of Agriculture in Dublany and was completely damaged during the Polish-Ukrainian war in 1818-1919 (Bernacki, 2007a, p. 8).

4. JULIUSZ AU'S ACCOUNTING THEORY

Juliusz Au developed a comprehensive, consistent proposal for farm accounting deserving to be called accounting theory. It covers three cognitive levels (aspects): general level, comprising the concept, objectives and accounting methods; procedural level, setting out rules for assets valuation, choice of the accounting period and calculation of production costs; supporting level, comprising organization of accounting, statistical data collection and audit procedures. Figure 1 presents the structure of farm accounting theory designed by J. Au.

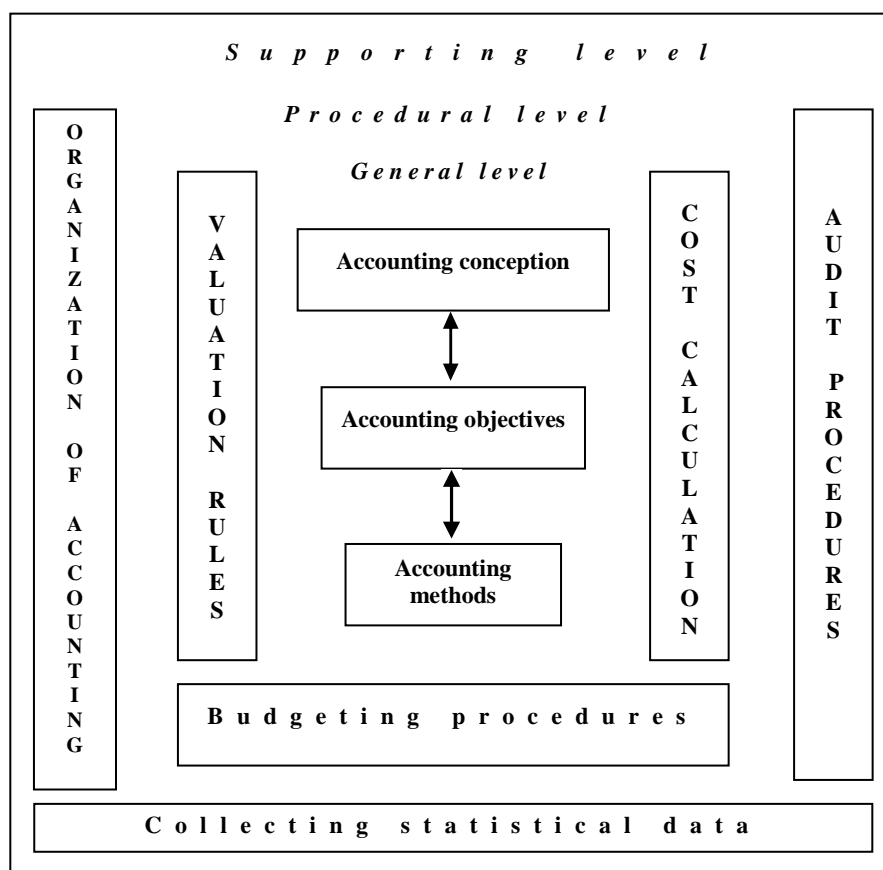


Fig. 1. Structure of J. Au's theory of farm accounting

Source: author's research based on Au (1889).

J. Au stated that the value of agricultural products is determined by the needs of society reflected in the market (fair) price or by the needs of a farm if the produce is used for such purposes. He pointed to effective organization of farm management as one of the ways of profit maximization, and emphasized the role of accounting in this task. He saw accounting as a “touchstone of good organization and a foundation for its improvement” (Au, 1889, p. II).

He defined accounting as “recording, collecting and systematic aggregating, in numerical terms, of all data relating to the state of the enterprise [...] and transactions carried out in a specified period of time, to show whether this state was favourable or unfavourable and whether the transactions were beneficial to the purpose of this enterprise or did not contribute to its attainment.” He also stressed the role of accounting in ensuring accountability of persons responsible for the functioning of a farm.

J. Au (1889, p. 3-5) formulated the following objectives of accounting:

- showing the assets position;
- showing the financial position;
- showing the financial results;
- assessment of profitability of different sections of the agricultural entity;
- determining return on capital;
- predicting the ability for continuing operation and prospects for profit growth;
- providing possibility for administrative function assessment;
- performance of the control function.

He also prescribed the following accounting methods (Au, 1889, p. 8-37):

- comparing annual inventories
- single-entry accounting methods;
- single-entry accounting proper;
- cameral accounting;
- double-entry accounting.

He was of the opinion that only double-entry accounting is appropriate for the farming business because: “The farmer should not bother himself with useless theories, and should not use arbitrarily set prices, but neither should he unthinkingly forego an accounting system which is capable of providing strict control and show which directions to pursue and which to give up” (Au, 1889, p. 37-38).

In addition to setting out detailed rules for keeping accounting records he provided guidelines for choosing the accounting period and preparing the opening balance-sheet. He claimed that “proper accounting, regardless of the method adopted, begins with inventory-taking” (1889, p. 39). He proposed the following valuation methods (Au, 1889, p. 45):

- current market (fair) prices – as a basis for current assets valuation;
- average market prices – for long-term assets valuation;
- production cost – for valuation of assets intended for use.

J. Au argued that valuation at current market price is the simplest, as it requires knowledge of prices at the nearest market-place. For valuation based on average market prices he recommended taking into account the prices at the nearest market in at least a five-year period. He warned that valuation at production cost, used for items whose market value – due to its absence – cannot be reliably measured, is the most difficult (Au, 1889, p. 45-46). The Table 1 below presents rules for valuation of assets, proposed by J. Au.

Table 1. J. Au's rules for assets valuation

Valuation at current market prices	Valuation at average market prices	Valuation at production cost
<ul style="list-style-type: none"> – farm produce for sale; – saplings ready to be sold; – domestic animals (excluding those intended for internal use); – animal products intended for sale; – finished goods; – financial assets. 	<ul style="list-style-type: none"> – land (excluding land purchased recently, which is valued at purchase price; – buildings, structures, improvements, and plantations (excluding those whose acquisition price or production cost are known; in these cases depreciation charges are made). 	<ul style="list-style-type: none"> – farm produce not intended for sale; – animal products not intended for sale; – natural fertilizers; – livestock raised on the farm; – buildings, structures, improvements and plantations whose production costs and depreciation charges are known; – tools and machines produced internally; – materials intended for further transformation.

Source: author's research based on Au (1889, p. 46-47).

J. Au argued that “attempts at valuation of items for which market prices do not exist according to artificial prices leads to fictitious, arbitrary figures, which results in double-entry accounting becoming a misleading exercise” (Au, 1889, p. 29). He attached great importance to accounting theory, expressing his concern that “It is in accounting theory that the need exists to clarify the simplest matters complicated by pseudo-scholars, the need to explain, even to people otherwise quite reasonable, that two and two makes four” (Au, 1889, p. 48).

J. Au explained that assets intended for internal consumption have only use value, which is equivalent to their cost. Only those assets which are to be sold have exchange value. He defined price as “an asset's exchange value expressed as a certain amount of another good that [...] we can obtain in exchange,” and market (fair) price as an asset's exchange value expressed as “the amount of money that we can obtain for it in the market-place” (Au, 1889, p. 49).

Although his own achievements in the field of agricultural chemistry are quite impressive, J. Au (1898, p. 77) declared, that “Accounting is a discipline in

which accountants and economists are the people that are really necessary. However, each pseudo-scholar thinks that it is his duty to patch on at least some chemistry, to make matters look more scientific. The result, naturally, resembles a patchwork, not very practical or useful.” He pointed out that having information on three main economic factors – land, capital and labour – it is possible to determine precisely the value and profitability of the assets.

J. Au also proposed solutions relating to costing and pricing of resources utilized in the farming business, such as feed for farm animals or fertilizers. When giving formulas for cost calculation, he reminded that “accounting is concerned with what a given product costs and what the price should be to make it profitable, and not with what it is made up of.” From the costing perspective, he made a distinction between animal feed produced on purpose, e.g. crops grown for use as fodder, and feed obtained as by-product, scrap or waste. For crops grown to produce feed he included in calculations such items as rent paid for the use of meadows and fields, cost of capital engaged in production, depreciation charges on improvements (draining system), overhead costs (e.g. administration, taxes, insurance) and wages. For feed obtained as by-product (e.g. straw) he recommended valuation „as difference between revenue from grain and cost of production,” including costs of transport and storage. Feed obtained free of any cost should not be valued at all.

J. Au attached great importance to budgeting. “It is not enough [...] to perform accounting calculations which show ex post if and to what extent the goal of the farming unit has been attained [...]. It is necessary to make relevant calculations well in advance to be able to control all activities in the farming business to ensure that they meet the desired end” (Au, 1889, p. 90). He argued that a properly performed planning process was essential to effective business activity, including farm operation. He viewed the revenue budget as guidelines for the employees and also as a tool of management control. Comparison of budgeted and actual figures provides a basis for evaluation of management. He explained that the budgeting process should begin with drawing up detailed budgets for major elements of property and major sections of the farming business, and should end with preparation of a master budget. The individual partial budgets should be prepared by persons supervising the different farm divisions, and the master budget – by general administration. He listed the following types of budgets, which he called “preliminary estimations” (Au, 1898, p. 92-103):

- cash receipts and disbursements;
- incomings and outgoings of farm produce;
- incomings and outgoings of animal feed;
- incomings and outgoings of livestock;
- demand for tools and equipment;
- demand for draught/manual labour;

- demand for and production of fertilizers;
- demand for firewood;
- garden and orchard.

For each of the budgets listed above he prescribed detailed procedures and forms which he devised himself. Items to be taken into account included: expected receipts; expected disbursements; types of resources covered by planning; time intervals used as basis for making comparisons.

J. Au (1898) distinguished between financial audit (audit of farm accounting books) and audit of agricultural unit (farm) performance. The objective of financial audit was to verify that: entries in accounting books correspond to the contents of accounting evidence (documentation); entries in accounting books are complete; entries in accounting books correspond to the transactions made.

Audit of farm performance was carried out to establish:

- concordance between transactions and the budget;
- economy, efficiency and effectiveness of activity;
- effectiveness of the use of resources;
- material variances and changes in comparison with the preceding period;
- differences in levels of similar types of expenses between different farms, for the purpose of making comparisons.

These audit procedures were designed to help in restructuring the activity of the farming unit by eliminating or limiting the unprofitable types of agricultural production and expanding the profitable ones. "All issues which gave rise to objections in the course of the audit process had to be investigated and explained and only then could the person keeping the account books receive the audit certificate for a given accounting period" (Au, 1889, p. 167).

J. Au also proposed various types of farm accounting organization depending on the scale of the farming activity. He recommended that in small farming units (single manor farm) control should largely be performed by the owner, while in larger estates comprising several divisions a cashier, bookkeeper and controller should be employed. Land stewards should be responsible for accounting at the level of the divisions, and the administrator – at the level of the farming enterprise as a whole. He explained (1889, p. 172-173) that the choice of accounts and elements of account books depends on: the character and organization of the farming business; importance of the types agricultural activity that the entity engages in; information that the accounting system is expected to provide; availability of qualified bookkeepers.

He also stressed the advisability of collecting statistical data, useful in evaluation of the entity's performance and organization. Such statistical data should include: air temperature, prices at markets where the farming entity sells its products or is planning to sell them, inputs in the different sections of production and the outputs obtained, yield from unit of area and capital used for unit of area.

5. MODERN PRINCIPLES OF BIOLOGICAL ASSETS MEASUREMENT IN INTERNATIONAL AND POLISH ACCOUNTING REGULATIONS

As regards present-day accounting regulations, specific solutions relating to measurement of biological assets are set out in IAS 41 *Agriculture* and in the FADN system (Farm Accounting Data Network). Polish accounting law does not provide separate rules to regulate this issue, which means that biological assets are measured at the balance sheet date at their cost less accumulated depreciation and impairment losses, and agricultural products are measured at their cost (purchase price or production cost) not higher than their net selling price (Kiziukiewicz, 2009, p. 135-137).

Under IAS 41 *Agriculture*, biological assets are measured at fair value less estimated point-of-sale costs. If the fair value of a biological asset cannot be measured reliably because market-determined prices or values are not available and alternative estimates of fair value are unreliable, that biological asset should be measured at its cost less any accumulated depreciation and any accumulated impairment losses (in accordance with IAS 2 *Inventories*, IAS 16 *Property, Plant and Equipment*, and IAS 36 *Impairment of Assets*). Value determined on the basis of purchase price or production cost is a close approximation of the fair value, providing that no significant biological transformation has occurred since the measurement date and the effect of the biological transformation on the price is not expected to be significant. If opportunity arises to determine reliably the value of a particular biological asset, the entity should measure it at the amount equal to its fair value less estimated point-of-sale cost. IAS 41 does not apply to inventories of agricultural products obtained from the entity's biological assets. In this case IAS 2 *Inventories* is applicable or another relevant standard (IAS 41, *Agriculture*, 2009).

Accounting is a basic source of information in development of Common Agricultural Policy for EU member states. The information is generated in the agricultural accounting system called FADN. Three measurement methods are used in this system:

- 1) realizable (settlement) value;
- 2) replacement cost;
- 3) historical cost.

These three methods are presented in Table 2.

Table 2. Methods of assets measurement according to FADN

Measurement method	Method description	Method application
1	2	3
Realizable value	Measurement of assets at net selling price without taking into account the selling expenses	Measurement of entity's agricultural produce

Table 2 (cont.)

1	2	3
Replacement cost	Measurement of assets at their current production cost	Measurement of tangible fixed assets
Historical cost	Measurement of assets at their production cost or acquisition price at the time of their production or acquisition	Measurement of acquired means of production, fixed assets under construction, and liabilities

Source: author's research based on Goraj, Mańko (2009, p. 59).

6. CONCLUSIONS

In the opinion of the author of this paper, analysis of the concepts and ideas formulated by Juliusz Au supports the theses at the beginning of this paper. The teaching of accountancy on Polish territories annexed by Prussia (the Prussian partition) was one of the methods of organic work devoted to improvement of farm management, both as regards farming in large landed estates and in small peasant farms. As part of Germanization processes and *Kulturkampf*, Prussian Chancellor Otto Bismarck closed down the Higher School of Agriculture in Żabikowo, in which accounting was an important element of the curriculum. In evaluating the conception of accounting designed by J. Au it is important to emphasize its broad scope covering all aspects of using accounting information for the purposes of evaluating and communicating the performance of farming entities.

J. Au's system of agricultural accounting published in 1889, and particularly its methods of assets valuation, are largely similar to solutions contained in IAS 41 *Agriculture*, issued 112 years later. The impact of his theory on Polish Accounting Act and the FADN system, though, has not been significant. Au propagated the use of market-determined price formulas, and in cases where they are not available (e.g. if a market for a given asset does not exist) he allowed the use of production cost as a basis for price determination. His definition of market price corresponds to the concept of fair value in present-day accounting regulations, having thus a universal character.

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