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# THE ORIGINS OF THE PRINCIPLE OF COMPARATIVE ADVANTAGE AND THE ROLE OF AGRICULTURE[2]

***The principle of comparative advantage is widely assumed to have been discovered by David Ricardo in 1817. However, some economic historians attribute the authorship to Robert Torrens or James Mill. We come to the conclusion that while Ricardo certainly played an important role, Torrens presented a satisfactory interpretation of the principle two years before him and should be deemed the original author. While there will always remain some controversy about the authorship, it is relatively straightforward to find the direct causes that enabled the discovery. We claim the Torrens-Ricardo principle of comparative advantage was a by-product of Napoleonic wars and the resulting continental blockade. These events led to a great agricultural debate between leading economists of the era and eventually resulted in the discovery of the principle.***

***Keywords:*** *economic history; international trade; comparative advantage; Torrens-Ricardo principle; relative cost ratio; great agricultural debate; Corn Laws.*

***JEL Classification:*** *F10, B12.*

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# ВИТОКИ ПРИНЦИПУ ПОРІВНЯЛЬНОЇ ПЕРЕВАГИ І РОЛІ СІЛЬСЬКОГО ГОСПОДАРСТВА

***У статті наведено, що принцип порівняльної переваги, згідно із загальноприйнятою думкою, був розроблений Давідом Рікардо в 1817 році. Проте деякі економічні історики приписують авторство Роберту Торренсу або Джеймсу Міллу. Ми дійшли висновку, що хоча Рікардо зіграв важливу роль, Торренс надав задовільне тлумачення принципу за два роки до нього і його слід вважати автором. Хоча завжди вестимуться дискусії з приводу авторства, відносно просто знайти прямі причини, які дозволили зробити відкриття. Ми стверджуємо, що принцип порівняльної переваги Торренса-Рікардо є побічним продуктом наполеонівських воєн і супутньої континентальної блокади. Ці події привели до розлогих дебатів відносно сільського господарства між провідними економістами того часу, що зрештою і привело до відкриття принципу.***

***Ключові слова:*** *економічна історія; міжнародна торгівля; порівняльна перевага; принцип Торренса-Рікардо; відносний коефіцієнт витрат; дебати відносно сільського господарства; хлібні закони.*

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# ИСТОКИ ПРИНЦИПА СРАВНИТЕЛЬНОГО ПРЕИМУЩЕСТВА И РОЛИ СЕЛЬСКОГО ХОЗЯЙСТВА

***В статье показано, что принцип сравнительного преимущества, согласно общепринятому мнению, был разработан Давидом Рикардо в 1817 году. Тем не менее, некоторые экономические историки приписывают авторство Роберту Торренсу или Джеймсу Миллу. Мы пришли к выводу, что в то время как Рикардо сыграл важную роль, Торренс представил удовлетворительное толкование принципа за два года до него и его следует считать автором. Хотя всегда будут идти дискусии по поводу авторства, относительно просто найти прямые причины, которые позволили сделать открытие.***

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[2] The paper was supported by VEGA 1/0911/11 "Styri slobody pohybu v EU" coordinated by prof. Lipkova.

***Мы утверждаем, что принцип сравнительного преимущества Торренса-Рикардо является побочным продуктом наполеоновских войн и сопутствующей континентальной блокады. Эти события привели к обширным дебатам относительно сельского хозяйства между ведущими экономистами того времени, что в конечном итоге и привело к открытию принципа.***

***Ключевые слова:*** *экономическая история; международная торговля; сравнительное преимущество; принцип Торренса-Рикардо; относительный коэффициент затрат; дебаты относительно сельского хозяйства; хлебные законы.*

**1. Introduction.** Discovery of the principle of comparative advantage has been one of the most important events in the history of international economics. Even though it was born in the beginning of the 19th century and over two centuries it has been challenged by numerous newer, more complex theories, the principle still remains valid. Paul Samuelson famously named it one of the few theories in economics that is simultaneously true and not obvious (Rogoff, 2005). Some economists even consider it "the deepest and most beautiful result in all of economics" (Maneschi, 1998). While the principle itself is globally known, the history of its discovery is not.

If asked, the vast majority of economists would probably claim that the uncontested author of the principle of comparative advantage was David Ricardo. The claim is supported by numerous economic textbooks [see, for example, Lipkova (2011) or Appleyard (2008)], journal articles and thousands of online websites. However, economic historians have long been stressing the importance of two other economists in the discovery of the principle: Robert Torrens and James Mill. Leser (1881), Seligman (1903), Viner (1937), Chipman (1965), Irwin (1996) and Maneschi (1998) offer evidence Torrens should be hailed as the original author of the principle; Thweatt (1976) and Rothbard (1995) draw the attention to the role of Mill.

Another common misconception is that the principle was discovered at the time of manufacturing boom in Europe and is therefore considered to be a by-product of the first industrial revolution. Conversely, as we shall see, the birth of the principle was a side-effect of a heated debate among economists on international trade with an agricultural product - corn.

The aim of this paper is to offer a brief history of the principle of comparative advantage, specifically focusing on the role of agriculture. We perform a thorough research of economic texts of the early 19th century and study the examples the authors made trying to develop the principle. We pay due attention to political and military situation of the period. We search for the real discoverer of the principle of comparative advantage and identify the factors that enabled this discovery.

**2. The principle.** The most famous example illustrating the principle of comparative advantage is Ricardo's (1817) notorious two-paragraph section dealing with international trade between England and Portugal. Using so-called "four magic numbers" (Maneschi, 2004) Ricardo demonstrated that even though Portugal is more efficient in production of both cloth and wine, it would be better off if it specialized in producing wine and exchanged a part thereof for cloth from England. England, being less efficient in production of both cloth and wine, would be better off if it specialized in producing cloth and exchange a part for wine from Portugal. In Ricardo's own words:

"England may be so circumstanced, that to produce the cloth may require the labour of 100 men for one year; and if she attempted to make the wine, it might require the labour of 120 men for the same time. England would therefore find it her interest to import wine, and to purchase it by the exportation of cloth.

To produce the wine in Portugal might require only the labour of 80 men for one year, and to produce the cloth in the same country, might require the labour of 90 men for the same time. It would therefore be advantageous for her to export wine in exchange for cloth. This exchange might even take place, notwithstanding that the commodity imported by Portugal could be produced there with less labour than in England. Though she could make the cloth with the labour of 90 men, she would import it from a country where it required the labour of 100 men to produce it, because it would be advantageous to her rather to employ her capital in the production of wine, for which she would obtain more cloth from England, than she could produce by diverting a portion of her capital from the cultivation of wines to the manufacture of cloth."

Ricardo's example has been taught for two centuries at almost all undergraduate and graduate courses in International Economics. It departed from the predominant view of the 18th century economists in that it acknowledged that mutual trade can be beneficial for two countries even if one of them is superior to the other one in production of all goods[3]. However, as brilliant as Ricardo's example is, it is doubtful whether he was the originator of the idea. Robert Torrens and James Mill had published similar - although arguably less complex - examples a decade before him. Some economic historians even suggest Ricardo did not understand the principle at all and it was James Mill who inserted the famous section into Ricardo's "Principles of Political Economy and Taxation" (Thweatt, 1976). Others believe the first satisfactory explanation of the principle was offered by Torrens (Viner, 1937). Let us therefore have a thorough look at the examples used in Torrens' and Mill's works.

**3. Roles of torrens and mill.** In 1808 both Mill and Torrens published works attacking physiocratic view on international trade. Mill (1808) condemned the firm belief of some economists that soil and agriculture are the sole source of national wealth and the government should therefore apply protectionist measures in primary sector. Mill used a simple example to show that England could be better off if it specialized in manufactures rather than devoting its all resources to produce steel:

"On making a ton of iron in Great Britain, let us suppose, that the labourers employed in providing the ore and the coals, and in smelting and preparing the metal, have consumed ten quarters of corn. Every ton of iron therefore prepared in Great Britain costs ten quarters of corn. Let us suppose, that in the preparation of a certain quantity of British manufactures, nine quarters of corn have been consumed; and let us suppose, that this quantity of goods will purchase in the Baltic a ton of iron, and afford, besides, the expence requisite for importing the iron into Britain. Is there not an evident saving of a quarter of corn, in the acquisition of this ton of iron? Is not the country one quarter of corn the richer, by means of its importation? In the importation of a thousand such tons, is it not a thousand quarters richer?"

[3] Contrary to popular belief, the 18th century rule of absolute advantage cannot be credited to Adam Smith. Henry Martyn established it already in 1701 in his "Considerations on the East-India Trade". Maneschi (1998) claims the origins of the principle are even older, dating them to 1673.

Torrens (1808) took the same stand using a different example:

"If I wish to know the extent of the advantage, which arises to England, from her giving France a hundred pounds of broad cloth, in exchange for a hundred pounds of lace, I take the quantity of lace which she has acquired by this transaction, and compare it with the quantity which she might, at the same expense of labour and capital, have acquired by manufacturing it at home. The lace that remains, beyond what the labour and capital employed on the cloth, might have fabricated at home, is the amount of the advantage which England derives from the exchange".

While Seligman (1911) considered Torrens' example an undisputable evidence of his authorship of the principle of comparative advantage, a careful reader would have already noted that none of these paragraphs actually succeeded in fully stating the principle. A student using one of these examples in en exam today would most likely get a "fail" grade. Mill and Torrens depart from the classical principle of absolute advantage by comparing internal cost ratio of one country with international price; however, they commit the mistake of not comparing autarky price ratios between the countries. Thus, Mill and Torrens state only a half of the principle.

A heavy-weight argument for ascribing the authorship of the principle of comparative advantage to Torrens is his paper "Essay on External Trade with Corn", published in 1815, two years earlier than Ricardo's "Principles of Political Economy". In a brilliant (but among general economists almost unknown) section he demonstrates that even if the fertility of English soil was comparable to that of Poland, it would still be in the interest of the country to import agricultural products from Poland:

"...let us suppose, that there are, in England, unreclaimed districts, from which corn might be raised at as small an expense of labour and capital, as from the fertile plains of Poland. This being the case, and all other things the same, the person who should cultivate our unreclaimed districts, could afford to sell his produce at as cheap a rate, as the cultivator of Poland; and it seems natural to conclude, that if industry were left to take its most profitable direction, capital would be employed in raising corn at home, rather than in bringing it from Poland at an equal prime cost, and at a much greater expense of carriage. But this conclusion, however obvious and natural it may, at first sight, appear, might, on a closer examination, be found entirely erroneous. If England should have acquired such a degree of skill in manufactures, that, with any given portion of her capital, she could prepare a quantity of cloth, for which the Polish cultivator would give a greater quantity of corn, than she could, with the same portion of capital, raise from her own soil, then, tracts of her territory, though they should be equal, nay, even though they should be superior, to the lands in Poland, will be neglected; and apart of her supply of corn will be imported from that country. For, though the capital employed in cultivating at home, might bring an excess of profit, over the capital employed in cultivating abroad, yet, under the supposition, the capital which should be employed in manufacturing, would obtain a still greater excess of profit; and this greater excess of profit would determine the direction of our industry."

We argue (Grancay, Szikorova, 2012) this is the first satisfactory explanation of the principle of comparative advantage[4] as it includes the comparison of autarky price ratios between countries. However, the text is not as clear and self-explanatory as Ricardo's famous example. It therefore requires further analysis.

Torrens begins with an assumption that quality and quantity being the same, the cost of raising corn in some parts of England is equal to the cost of cultivating corn in Poland. Under these circumstances it seems perfectly logical that (1) no gain can be made from mutual trade and (2) both countries should produce corn for their own consumption. But would this logic hold if we introduced another sector - say production of textiles - into the analysis? Torrens' answer is “no”. Suppose, as Torrens does, that England is more productive in manufacturing cloth than Poland. This means if both England and Poland use the same amount of capital in preparing cloth, England's output will be greater than the output of Poland. It follows that relative price of cloth in Poland is higher than in England. Therefore, if England wants to maximize her return on capital, she should specialize in producing cloth, export it to Poland and exchange it for corn. In such a manner, employing the same amount of capital, she can acquire greater amount of corn than she could grow at home. The principle of comparative advantage has thus been fully stated.

Some critics claim Torrens' account of comparative advantage is incomplete and erroneous. Ruffin (2002, 2005) states: "[Torrens] alludes to the fact that England should produce manufacture even if it is superior to Poland in corn production. But suppose Poland's productivity disadvantage was smaller in manufacturing than in corn production!" Obviously, in that case Torrens' statement would be completely wrong. However, this is not the case. Torrens assumes agricultural productivity is the same in both countries. He goes on assuming that England can exchange the same amount of cloth for more corn abroad than home. This effectively means - remember productivities in agriculture are the same - that relative price of cloth in units of corn in Poland is higher than relative price of cloth in England. In the framework of classical economics this can be the case if and only if Polish manufacturers of cloth are less productive than English cloth-makers. Ruffin's argument is therefore incorrect and Torrens' example holds.

Another common criticism alludes to the fact that Torrens did not prove his theorem using a numerical example. Maneschi (1998) and Ruffin (2002) miss a "home run" in Torrens' work, something as persuading as Ricardo's "four magic numbers". Admittedly, Torrens really did not use actual numbers; but as we already explained, he used comparatives. And while Ricardo's example is undoubtedly more appealing, the essence of Torrens' interpretation is effectively the same.

Indeed, Ricardo's "Principles" (1817) offers a more complex explanation of the principle of comparative advantage than Torrens' "Essay on External Trade with Corn". Not only it includes the famous numerical example, it is also the first work to demonstrate gains from trade for both countries. Torrens showed how trade benefitted England. Ricardo showed how trade benefited both England and the other country (in his case Portugal). Even though some economists might see a serious flaw in an example not mentioning gains for both countries, as a matter of fact it is only a question of simple math and common sense. Already Smith (1776) understood that for trade to take place both parties need to expect gain from it. If one party does not expect any gain, it will not enter into trade with the other party. Moreover, if one party

[4] Other notable economists sharing the view include Leser (1881), Seligman (1903 and 1911), Viner (1937), Chipman (1965), Irwin (1996) and Maneschi (1998).

is able to exchange certain amount of cloth abroad for more corn than she would get at home, the rules of math clearly imply that the other party will be able to exchange certain amount of corn abroad for more cloth than she would get at home. Thus, as long as trade is mutually beneficial, Torrens' explanation of the principle of comparative advantage can be considered complete.

We have yet to examine the role of James Mill in creating the principle. We have already explained that the section in his 1808 "Commerce Defended" cannot be considered satisfactory. Though, some economists claim Mill had a much better understanding of the principle than Torrens and Ricardo. Rothbard (1996) attacks Ricardo's famous three paragraphs and describes them as "carelessly worded and confused". His criticism continues: "Even Ricardo's sudden reference to Portugal and his absurd hypothesis that the Portuguese had an absolute advantage over Britain in the production of cloth, seem to indicate his lack of serious interest in the theory of comparative cost". Thweatt (1976) goes even further and argues the law of comparative advantage was injected into the Principles by Ricardo's mentor James Mill. Rothbard (1996) also claims Torrens committed several "egregious" errors when trying to establish the principle. For example, "Torrens claims that trade yields greater benefits to a nation that imports durable goods and necessities as against perishables or luxuries." The statement is indeed false. However, it was Mill, and not Torrens, who committed the most blatant error of all.

In his "Elements of Political Economy" (1821), after providing a decent presentation of the basic principles of the law of comparative advantage, Mill's attempt to give a numerical example goes completely wrong:

"A quantity of corn which costs [Poland] 100 days' labour, being equal to the quantity produced in England by 200 days' labour, would purchase, in England, the produce of 200 days' labour in any other commodity; for example, in cloth. But the produce of 150 days' labour in England in the article of cloth, is equal to the produce of 100 days' labour in Poland. If, with the produce of 100 days' labour, [Poland] can purchase, not the produce of 150, but the produce of 200, she gains to the amount of 50 days' labour; in other words, a third."

The blunder is obvious. If Poland exports corn to England and exchanges it for cloth, it will gain the amount of 33 days' labor; but Mill comes to the erroneous result of 50. Moreover, elsewhere in the text he claims gains from international trade are divided equally between two countries - another evident mistake. We believe the economist who made these fatal errors in a textbook cannot be considered to have understood the principle of comparative advantage, let alone to have originated it.

Another economist whose name is firmly connected with the law of comparative advantage is James Mill's son John Stuart. In his “Principles of Political Economy” (1848) he provided the first complete account of the law. Although he did not invent the law, Mill's text has played the most important role in its dissemination and it has been successfully used in some classrooms until today.

**4. The ultimate cause - Napoleon and trade with corn.** Most likely, economists will never settle the debate about the authorship of the principle of comparative advantage. For every argument in favor of Torrens, there is a counterargument. The same is valid for the arguments stressing the roles of Ricardo and Mill. Our opinion clearly suggests Torrens should be considered the author of the principle, but some economists will always claim otherwise. 200 years after discovery of the principle it became still more and more difficult to find the indisputable truth. Therefore, let us not spend too much time on this topic. Let us instead focus on searching for the ultimate reason behind the discovery of the principle: What enabled Mill, Torrens or Ricardo (whoever was the first) to come to understand the law?

The answer is surprisingly straightforward, even if a bit unexpected. While discovery of the principle coincides with the industrial revolution in Europe, it was not born as a side-effect of the revolution, but rather as a direct effect of two great agricultural debates. The originator of the whole sequence of the events that led to the birth of the principle was the French general Napoleon Bonaparte.

At the beginning of the 19th century the United Kingdom was the literal ruler of the seas. The French did not have the means to defeat the British at sea. Moreover, the UK saw a huge increase in its industrial production and became the undisputed world economic superpower. Napoleon sought to put an end to this dominance. In November 1806 he issued the Berlin Decree, ordering blockade of England from all trade with the European continent. Napoleon forbade all thecountries allied or dependent upon France to import British goods. Political and economic effects of the blockade itself were questionable and led Lord Thomas Erskine, a famous British lawyer and politician, to pronounce that Napoleon might just as well have declared the Moon in a state of blockade (Heckscher, 1918).

In a response to the Berlin decree the UK issued Orders in Council of 1807, that forbade trade between France and the UK and its allies. The two acts led to a heated debate between the leading economists of the era. William Spence (1807) published "Britain Independent of Commerce" where he advised Englishmen not to worry about the blockade, since only agriculture was economically important (Rothbard, 1996):

"I shall now endeavour to prove, that Britain does not derive any accession of wealth whatever from commerce of export, and consequently, that her riches, her greatness, and her power are wholly derived from resources within herself, and are entirely and altogether independent of her trade!" (Spence, 1807).

Spence proceeded even further, calling Napoleon's blockade "a scheme which abundantly evinces miserable littleness of his views on matters of political economy".

Mill and Torrens disagreed with Spence's opinion. As we have already seen, Mill in "Commerce Defended" and Torrens in "Economists Refuted" argued agriculture and natural resources are not the only sources of nation's wealth. They disagreed with Spence's claim that Britain does not derive any accession of wealth from international trade. Both of them showed trade is advantageous as long as England obtains foreign goods using less labor and capital than the amount of labor and capital that would be spent producing these goods at home. However, this was only the beginning.

Britain's growing population, bad harvests and Napoleon's blockade led to the shortage of corn on the isles. Consequently, the price of corn increased sharply. This suited the interests of British landowners, boosting their profits. When Napoleonic wars were coming to the end, the landowners began to worry - peace with France would enable free trade of corn, lowering prices and diminishing profits. Therefore, landowners initiated a strong push to introduce duty on the imported corn.

One of the strongest supporters of the so-called Corn Laws was Thomas Malthus. He argued (1815) it was not landowners' interests which mattered the most, but it was Britain's need to be self-sufficient in food production. Britainis dependenceon foreign corn was Britainis dependence on foreign politicians and foreign export taxes. Malthus also claimed free importation of foreign corn would lower domestic wages, which he saw as a barrier for growth.

"But a government may certainly see sufficient reasons for wishing to secure an independent supply of corn. This is a definite, and may be a desirable, object, of the same nature as the Navigation Act [...] I firmly believe that, in the actual state of Europe, and under the actual circumstances of our present situation, it is our wisest policy to grow our own average supply of corn; and, in so doing, I feel persuaded that the country has ample resources for a great and continued increase of population, of power, of wealth, and of happiness."

Mill, Ricardo, Torrens and others disagreed with Malthus' arguments. The period between 1815 and 1820 saw an explosion of tractates opposing Corn Laws. The majority of economists attacked the Laws - as Rothbard puts it (1996) - in a typical "Ricardian" way, that is, focusing on wealth-creating effects of abolishing the tariff on corn. Their main line of argument was that importing foreign corn would lower subsistence costs and wage rates, thus leading to higher profits which would in turn stimulate capital investment and economic growth.

Torrens used a different line of reasoning. In addition to applying the classical "Ricardian" arguments, he studied the effects of Corn Laws on Britain's foreign trade.

"The laws [...] affect every individual in the country, from the opulent landholder to the common day-labourer. An error respecting them may be fatal. Their influence extends through every part of the economical system. They regulate the supply of food, and the value of money; agriculture, commerce, and public credit, feel their powerful operation."

Torrens came to an unequivocal conclusion that the Corn Laws diminished national wealth of England:

"[...] it may, perhaps, appear somewhat paradoxical to say, that a measure which should extend agriculture, and increase the value of land, would be injurious to prosperity, and diminish wealth; yet such would certainly be the case. Even upon the principles of those, who assert that agriculture is the only source of wealth, it is demonstrable, that the general opulence of these countries would be diminished by a restriction upon importation, forcing our inferior lands into tillage."

A few lines later, Torrens hit the nail on the head and came close to correctly stating the principle of comparative advantage:

"If, in consequence of our skill in manufactures, any given portion of our labour and capital can, by working up cloth, obtain from Poland a thousand quarters of wheat, while it could raise, from our own soil, only nine hundred; then, even on the agricultural theory, we must increase our wealth by being, to this extent, a manufacturing, rather than an agricultural people. Though the economist should establish the fact, that our manufactures brought none of this wealth into existence, but that the whole was created by the cultivator of Poland, yet this would not, in any way, alter the state of the case. We have a hundred quarters of corn more than we could have obtained by raising it from our own soil. Though our manufacturers should not have increased the wealth of the world, yet they have increased the particular wealth of England."

The full principle of comparative advantage was stated 40 pages later, in another section arguing against Corn Laws; we have analyzed it earlier in this paper.

Torrens' arguments were later repeated by both Mill and Ricardo. Whether they were aware of each other's work is of no significance for us. While it seems logical that they were, all of them came to the same conclusion: foreign trade can be beneficial to Englishmen as long as they focus on producing what they produce with the lowest relative costs. The principle of comparative advantage was therefore born under direct influence of Napoleonic wars, continental blockade and Corn Laws. It has been, after all, a result of a great agricultural debate on the morning of industrial revolution.

**5. Discussion.** It seems correct to claim that the original discoverer of the principle of comparative advantage was Robert Torrens. As we explained, his account of the principle can be considered fully satisfactory and complete. It is undeniable that David Ricardo's presentation two years later was more complex. James Mill also provided some valuable insights into the topic, but committed two egregious errors which in our opinion disqualify him from claiming coauthorship. Therefore, we agree with Kemp and Okawa (2006) who suggest the principle be called "Torrens-Ricardo principle of comparative advantage".

Regardless of who the real discoverer was, the discovery was directly caused by Napoleon's blockade of Britain, by Corn Laws and the great agricultural debate that ensued. Economists of the era found themselves trapped in a long discussion about the importance of agriculture and free trade. While some (notably Spence) argued blockade could bring no damage to British economy, others criticized this view and stressed the importance of free trade. The debate heated up in 1815 with the adoption of Corn Laws, forbidding importation of corn into Britain until the price reached at least 80 shillings a quarter. Yet again, the economists could not agree whether the Laws were beneficial or harmful for British economy. Most of the arguments were centered around wage rates, profits and investment. However, a group of economists, including Torrens, Mill and Ricardo, focused their attention on foreign trade. They demonstrated that free trade leads to better allocation of resources and brings advantages even for those participants who wouldn't benefit under Smith's doctrine of absolute costs. Under these conditions the principle of comparative advantage was born - to demonstrate the importance of foreign trade for England and to settle the claims that agriculture is the most important sector of country's economy and should be protected under all circumstances.

This is not to say had it not been for Napoleon's blockade, the principle of comparative advantage would still be unknown today. The 19th century economists reached such a level of expertise, that they would surely have discovered it sooner or later. However, we believe the blockade accelerated the course of the events.

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Стаття надійшла до редакції 27.02.12