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Success and constraints in the adoption of the metric system in Portugal

(1) The origins and first attempts of standardisation

As in other European countries and during several centuries, Portuguese reforms of weights and measures failed their purposes contributing even, in some occasions, to the damage of the situation but maybe also to the fact that Portugal integrated the first contingent of adopters of the French Metric System, sonly recognizing the advantages of a decimal system. However, particular aspects differ from other local histories in the set of the European countries.

The country, with its near nine centuries history, has a special geographic situation in the extreme west of Europe, sharing with Spain the Iberia Peninsula and facing the Atlantic Ocean. This position, also with a direct entrance into the Mediterranean Sea, explains the different human influences marking the Portuguese national identity. These influences occurred by temporary occupation of the territory (Roman, Arab, Spanish, French, English people…), by the arrival of different ships with commercial proposals (Greek, Nordic people…) and also by the Portuguese Maritime Expansion (Africa, India and Brazil).

It is possible to refer the use of weights and measures in the Portuguese territory, at the minimum, since the Roman domination. After the Arabic occupation, some ancient Roman measures maintained; in other cases, Arabic measures imposed their use.

With the Christian re-conquest, reappeared some of the old Roman units and remained some of the Arabic, or only their nomenclature was adapted to other measures.

From Roman origin we can identify, among others, the *milha* (1852,4m), *libra* (343,5g), *onça* (28,68g), *emina* (270,833g) and *modio (8,67L)*. From Arabic origin it is possible to name over: *quintal* (4 arrobas–58,752kg), *arroba* (32 arráteis–14,688kg), *arrátel* (459g), *alqueire (13,6L)* and *almude (16,8L)*. Greeks gave us the *dracma* (3,57g).[1]

Units changed from one region to another or some units with the same designation changed depending on the goods to be measured, as was the case of the pound (*libra*) for the linen (0,918kg) and the pound for pharmacy (0,3435kg).[2]

In order to better understand the situation when the adoption of the Metric System occurred we will do a brief course by the successive attempts to establish the equality of weights and measures in the Portuguese kingdom. All these efforts and the formal adoption of the metric system were made before the establishment of the Portuguese Republic in 1910 October 5.

The first Portuguese king, Afonso Henriques, when of his ample Christian re-conquest, distributed different units of weights and measures to the new regions or cities, depending on political reasons. We were in the 12th century in the low Mediaeval Age. Laws differed from one region to another and permitted the change of the magnitude of the unit used to pay the tributes at any time. It was the complete absence of uniformity and provoked abuses and misuses.

During the kingdom of Afonso IV, in the *Cortes* of Lisbon 1352, the people claimed for standardisation and against the differences between the *alnas* and *côvados* (0,68m) [3] and also against

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[1] The equivalences for the metric system were done by Fradesso da Silveira in 1856, having as base the standards of Lisbon imposed during the reign of Sebastião (1575). *Cf.* J.H. Fradesso da Silveira (1856): *Compendio do Novo Systema Legal de Medidas* (Lisboa: Typographia do Centro Commercial).

[2] In: Fradesso da Silveira (1856). *Ibidem.*

the differences among the units of capacity. The king decided that the standard of the measure for tissues will be the *alna* of Lisbon. However, he never took any decision in order to solve the problem of the differences among the units of capacity as well as he never succeeded imposing a unique standard for measures. In Portuguese Mediaeval churches, castles and central market squares, it is frequent to found the *côvado* engraved in well exposed stones.

Pedro I, in Évora 1361, decided to compare the units for the cereals with the *alqueire* of Santarém and the measure for the wine by the *almude* of Lisbon. He also decided the standardisation of the units of weight by the *arroba* of Lisbon and forbade the use of stone-weights, imposing the use of iron-weights.

The king Fernando (Lisbon, 1372) orders that weights and measures were a royal determination and forbade their change in different regions without authorization. Pedro I had already forbidden stone-weights, however, João I, in Coimbra 1391, felt the necessity of reinforcing again the imposition to make the units of weight in iron.

Afonso V, was the first king to impose the organisation of a written juridical code. In Lisbon 1455, he deliberated the establishment of six different standards for the entire Kingdom: Santarém, Porto, Guimarães, Ponte de Lima and Lisbon.[4]

João II (in Évora 1490) determined the existence of only two legal standards for the capacity, one for the North and Algarve (standards of Porto) and the other for the Centre of the kingdom (standards of Lisbon). He imposed a common nomenclature for the units of capacity for dries and liquids. Existing historical documents permit to notice that until this period all the attempts of standardisation failed completely. Fairs and markets had their proper trend codes, uses and measures! It was frequent the coexistence of more than one unit of measure in the same place. In a Church from the 15th century there are two different units engraved in the same stone, the *côvado* and the *vara*, showing exactly that both were used at the time in that place.[5]

During the reign of Manuel I, science, art and the external trade developed. Lisbon and its harbour transformed in the main centre of commercial changes in Europe. The time imposed more serious steps of standardisation in Portugal.

This king, during which reign maritime way to India and Brazil were discovered, imposed the use of the measures of Lisbon in the entire kingdom and defined multiples and submultiples of the main units (length-*vara*, weight-*marco* and capacity-*canada*). The *marco* was the chosen unit of weight and their multiples and submultiples were well defined, in a base two relation.

However, he only ordered the construction of sets of bronze-weights, in Flemish Lands. Regional sets of measures for capacity, specially made in wood, from the standards of Lisbon, were built in different regions. Apparently, the tentative succeeded respecting to the weight standards.

Practically at the end of the 16th century (1575), under the reign of Sebastião the use of all of the standards of Lisbon were reinforced and the king ordered the construction of the units of capacity, in bronze. He also established that every region must build, in Lisbon, its set of standards in bronze and officially calibrated. However the new standards never arrived to the entire kingdom. Once again, the necessary and desirable standardisation did not occur.

During Spanish domination (1581–1640) the Spanish kings Filipe II, Filipe III and Filipe IV reinforced the use of the standards of Sebastião. It was the last well-known tentative of standardisation in Portugal until the work developed in order to adopt a Decimal System.

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[3] *Alna* was a unit with French origin- *Aune*. Bento Fernandes (1555) refers that the *alna* corresponds to the *côvado* of Lisbon, however there is a very small difference, because 30 *alnas* contained one additional *côvado*. *Cf.* A. A. Marques de Almeida (1994): *Aritmética como Descrição do Real (1519-1679)* (Lisboa: Imprensa Nacional, Casa da Moeda), vol. I., p. 229.

[4] *Cf.* S.F. Mendo Trigoso (1815): "Sobre os Pesos e Medidas Portuguezas, e sobre a Introdução do Systema Metro-Decimal", *Memórias Económicas da Academia Real das Sciencias de Lisboa para o Adiantamento da Agricultura, das Artes e da Indústria em Portugal, e suas Conquistas*. Tomo V (Lisboa: Typografia da Academia Real das Sciencias), pp. 336–411.

[5] They are engraved in a stone of the Church of Madalena in Monforte and there is a copy in the Metrological Museum, integrated in the Portuguese Institute for The Quality (IPQ) at Almada, in: http://www.ipq.pt/museu/index.htm.

(2) Time for standardisation

The 18th century was marked by a large idea of humanism and universalism, represented by the Illuminist ideas. However, until the strong earthquake that occurred in 1755, Lisbon was practically a mediaeval city. The destructive power of the earthquake conducted to the disappearance of the old town and to the rebuilding of a completely new city, oriented by commercial interests and replacing the anterior religious centrality of its organisation. That episode probably was determinant in subsequent decisions concerning weights and measures in Portugal. The majority of the calibrated standards of Lisbon, particularly the standards of length and capacity, disappeared. As written by Mendo Trigoso:

> The calamitous earthquake in 1755 and the subsequent fire destroyed all the standards of capacity for dries (cereals) and liquids as well as for length. These last standards were substituted by a beam with the côvado and the vara engraved.[6] As consequence it is supposed the deformity of the units built after that. Where can we search for the measure ordered by that king [Sebastião]? Where could we find the standard for the calibration of the different measures? [7]

At the time, France was the scientific centre of the world and the French Revolution in 1789 consolidated the ideal of human equality emergent from Illuminist philosophy. The great ideal of the Human Rights declared in order to have universal value, influenced successive reforms in a large spectre of areas. One interesting example was the establishment of the first Constitutional Codes, after France in 1792, in many European countries, namely Spain and Portugal. These juridical initiatives represent the sound adoption of the principles of equality defending citizens from preceding arbitrariness of laws.

Exactly in the same year of the French Revolution, occurred the publication of the *Traité Élèmentaire de Chimie*, by Lavoisier. Two years before, Lavoisier, Berthollet and Fourcroy created the new Method for the Chemistry Nomenclature. The great quantity and disorder in the names for the chemical substances and the absence of criteria for the designation of new substances were solved.[8]

All these aspects were convergent and decisive in a period requiring standardisation.

Two years after, on May 1790, the Constitutional Assembly approved a Law requiring the standardisation in all the units of weights and measures. Then, the Royal Academy of Science of Paris formed a Committee including Lavoisier, Lagrange, Monge, Cassini, Coulomb, Berthollet, among others, in order to think about the subject. Laplace suggested the name *mètre* for the unit of length. On December 1799 the French Metric System was established.

In the year of 1802 Portugal imported from Paris prototypes of the French new units. This is an interesting aspect to notice that it occurred only three years after the establishment of the Metric System in France. The standards were ordered to Paris by D. Rodrigo de Sousa Coutinho in the beginning of the 19th century, and they are well preserved in the Astronomical Observatory of the University of Coimbra. In the figures 1 and 2 we can observe the metre built by Lenoir and the litre built by Fortin.[9]

Figure 1. Metre Standard in iron (1802)

[6] The necessity of to engrave two different measures is an indicator of the coexistence/maintenance and the permission of use, at the time, of different units for the same measurement / greatness / magnitude.

[7] *Cf.* S.F. Mendo Trigoso (1856): "Sobre os Pesos e Medidas Portuguezas, e sobre a Introdução do Systema Metro-Decimal", *Memórias Económicas da Academia Real das Sciencias de Lisboa para o Adiantamento da Agricultura, das Artes e da Indústria em Portugal, e suas Conquistas*. Tomo V (Lisboa: Typografia da Academia Real das Sciencias), p. 378.

[8] *Cf.* B. Bensaude-Vincent; N. Journet (1993): "Rien ne se perde, rien ne se crée: Tout se pèse", *Les Cahiers de Science et Vie. Les Peres Fondateurs de la Science. Lavoisier*.

[9] *Cf.* http://www.astro.mat.uc.pt/novo/observatorio/site/museu/Acesso.htm.

Figure 2. Litre Standard in brass (1802)

In 1806 the relation between the kilogram and the old Portuguese standards of weights were already established.

Between 1807 and 1811 Portugal was invaded and largely aggressed by the French army. We name that war "Peninsular War". The 2nd centenary of the beginning of French Invasions occurs exactly in the year 2007; the 1st invasion, commanded by the General Junot, took place in November 19, with the entrance by the region of the authors of this study.

Because of the French invasions the Portuguese Royal Family embarked to Brazil (1807–1821). Once finished the war, still with the Royal Family in Brazil and under the regency of the Prince João, the hereafter king João VI, on December 1812, a Commission was created in order to proceed to the Examination of the Registers and for the Improvement of the Agriculture. In a few time this Commission concluded that its work implicated and must to require the reform of the weights and measures Portuguese system. The Regent Prince ordered the enlargement of the Commission integrating seven members from the Academy of Sciences of Lisbon.[10] Only three months after (February 1813) the Commission presents the Plan of the Reform of the Units of Measure for Portugal. On August 1814 the regent Prince approved the Plan and ordered its extension to Brazil and to all Portuguese Overseas (only 15 years after the official establishment of the Metric System in France, which obligatory use in this country only occurred in 1840).

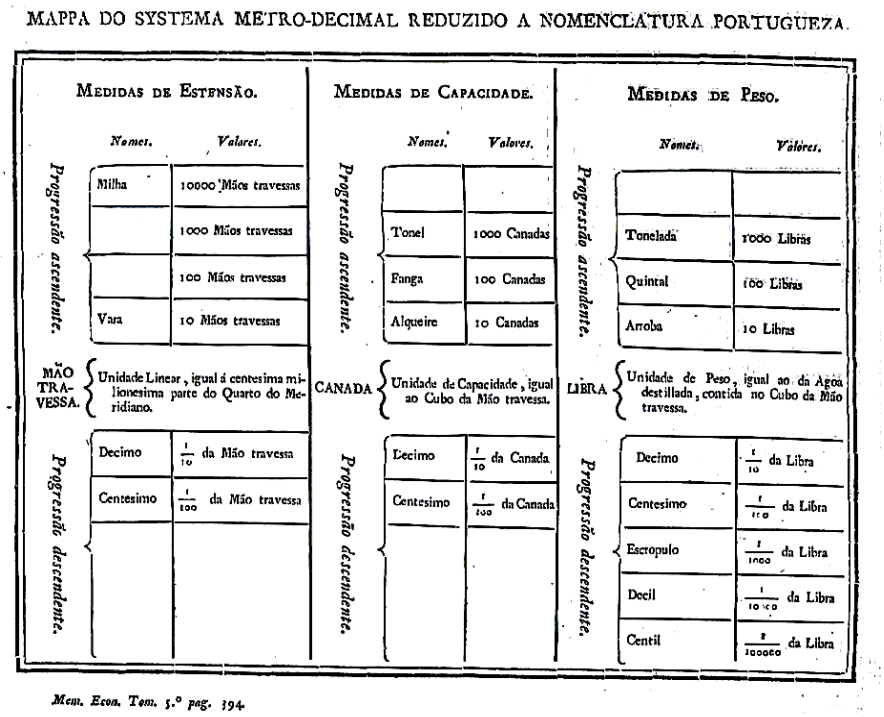
In the work, the Commission adopted, immediately and unequivocally, the decimal principle. However, the unit of length was defined as the cent-millionth part of a quadrant of a meridian of the earth — it was the tenth part of the French metre. Concerning this aspect, Mendo Trigoso wrote in a footnote:

> The kilogram or cubic hand, is not properly the French Metric System unit, but it is a millionth part of that kilogramme, and because of that we named it as gramme; but the comparison that we need to do with our actual weights imposed us, as necessary, this little change, which does not essentially influence the System. It is well fundamented because it was taking the kilogramme and not the gramme as the base, that in fact, all the experiences in order to determine the unit of weight were done. [11]

[10] Three members coming from the Class of Mathematics: Francisco Paula Travasos, Anastácio Joaquim Rodrigues and Matheus Valente do Couto; the others coming from the Natural Sciences Class: Alexandre António das Neves, António Araújo Travassos, Sebastião Francisco Mendo Trigoso e João Bell. The underlined names accompanied all the process, because after the approval of the Reform Plan by the Regent Prince, the Government ordered that these three Officials from the Royal Body of Engineering were associated to the Comission of Forais into the plane of the whole Commission. I.e. they also accompanied all the process of the construction of the new standards and of gathering and comparing the old with new standards. *Cf.* J. B. Silva Lopes (1849): *Memória sobre a Reforma dos Pesos e Medidas em Portugal segundo o Systema Métrico – Decimal* (Lisboa, Imprensa Nacional).

[11] *Cf.* S.F. Mendo Trigoso (1815): "Sobre os Pesos e Medidas Portuguezas, e sobre a Introdução do Systema Metro-Decimal", *Memórias Económicas da Academia Real das Sciencias de Lisboa para o Adiantamento da Agricultura, das Artes e da Indústria em Portugal, e suas Conquistas*. Tomo V (Lisboa: Typografia da Academia Real das Sciencias), pp. 336–411.

The Commission, conscious of the popular repugnance to everything with French connotation, defended in its report the non use of the French nomenclature for the new units to be adopted. As said, the decimal system was adopted but the units, with their decimal multiples and submultiples, adopt the name of the nearest ancient Portuguese unit: *mão-travessa* (hand = 1dm), *canada* (litre =1dm^3) and *libra* (pound = 1kg). This proposal was not absent of concerns, especially concerning the units of length; the Commission felt the difficulty to propose a Portuguese unit which magnitude was near from the French metre.[12] However, choosing the *mão-travessa* for the unit of length, the proposed Decimal System was very rational, because all the fundamental units were directly related among them, and based on that unit of length (one *canada* was exactly the amount of liquid contained in a cube with one unit of length *mão-travessa* by side; one pound was exactly the weight of the amount of water contained inside the *canada*).[13]



MAPPA DO SYSTEMA METRO-DECIMAL REDUZIDO A NOMENCLATURA PORTUGUEZA.

Medidas de Estensão.			Medidas de Capacidade.			Medidas de Peso.		
	Nomes.	Valores.		Nomes.	Valores.		Nomes.	Valores.
Progressão ascendente.	Milha	10000 Mãos travessas	Progressão ascendente.			Progressão ascendente.		
		1000 Mãos travessas		Tonel	1000 Canadas		Tonelada	1000 Libras
		100 Mãos travessas		Fanga	100 Canadas		Quintal	100 Libras
	Vara	10 Mãos travessas		Alqueire	10 Canadas		Arroba	10 Libras
MÃO TRAVESSA.	Unidade Linear, igual á centesima milionesima parte do Quarto do Meridiano.		CANADA	Unidade de Capacidade, igual ao Cubo da Mão travessa.		LIBRA	Unidade de Peso, igual ao da Agoa destillada, contida no Cubo da Mão travessa.	
Progressão descendente.	Decimo	$\frac{1}{10}$ da Mão travessa	Progressão descendente.	Decimo	$\frac{1}{10}$ da Canada	Progressão descendente.	Decimo	$\frac{1}{10}$ da Libra
	Centesimo	$\frac{1}{100}$ da Mão travessa		Centesimo	$\frac{1}{100}$ da Canada		Centesimo	$\frac{1}{100}$ da Libra
							Escropulo	$\frac{1}{1000}$ da Libra
							Decil	$\frac{1}{10000}$ da Libra
							Centil	$\frac{1}{100000}$ da Libra

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Figure 3. Table with the work done by the Commission of the Royal Academy of Science of Lisbon (1813).

On 1814 December the Government imposed the construction, by the Portuguese Army Arsenal, of those new standards of weight and measure. On 1816 July two sets of the standards were received in Brazil. Three hundred sets of the new standards were constructed: the more completely 50 for the main cities and they were in bronze or in brass; the remained 250 for the little communes and they were made in melted iron or in cupper. The first ones, including other auxiliary instruments, were kept in special cases made in precious wood.

[12] As referred by Mendo Trigoso: "our *legoas* (…) are bigger than the tenth millionth part of the quarter of the meridian or a thousand metres (…) if our actual *vara* was divided into *mãos-travessas* each one equal to the tenth part of the metre, it will count eleven *mãos travessas*". Cf. Mendo Trigoso (1815): "S.F. Sobre os Pesos e Medidas Portuguezas, e sobre a Introdução do Systema Metro-Decimal", *Memórias Económicas da Academia Real das Sciencias de Lisboa para o Adiantamento da Agricultura, das Artes e da Indústria em Portugal, e suas Conquistas*. Tomo V (Lisboa: Typografia da Academia Real das Sciencias), pp. 336–411.

[13] Beyond the units of length, capacity and weight (represented in each of the three columns in the Table of Figure 2) units for area derived from the units of length were also defined: *aguilhada* defined by a square with ten *mãos-travessas* by side and the *geira*, defined by a square with one hundred *aguilhadas*. Cf. Silva Lopes, J.B. (1849): *Memória sobre a Reforma dos Pesos e Medidas em Portugal segundo o Systema Métrico-Decimal* (Lisboa: Imprensa Nacional), p. 14, "Appendix".

Between May 1817 and March 1818 the king João VI ordered that all the old standards from the different regions would be brought to Lisbon or Coimbra in order to compare them with the new standards. From this hard work, conversion tables of the units used in each region were organised. Early in the year 1820, communes from the region of Lisbon and Algarve received orders for to carry the new standards in the Army Arsenal and instructions relating to the way how the payment must be done. Immediately, on March 1820, in a Decree in Law the government ordered that primary teachers oblige children to memorize this new Decimal System "with the intention that people had reach sufficient notice before their entrance in practice".

However, once again, a particular episode of the Portuguese History constrained the full adoption of this new "Portuguese" Decimal System, which had the yet evidenced difference from the French Metric System. On August 1820 took place the Liberal Portuguese Revolution and few years after (from 1832 to 1834) a Civil War occurred, between absolutists and liberals. All the anterior intentions failed and the work in progress stopped. As referred by Silva Lopes [14] these orders never were executed and may be nor was sent the proper Decree. The Commission seems to have disappeared, because a Decree of the king Pedro IV, from August 1833, reconstitutes that Commission. The change into a parliamentary political regimen probably contributed to some retards. The proper principles of the System of Measures were discussed again. New and different solutions, far from the French Metric System, were pondered. Since 1843 the academic and deputy Silva Lopes soundly interested himself by the question. He proposed at minimum three Law proposals for the standardisation on the base of the French Metric System (1845, 1848, 1849) that never were completely approved. We must underline that all these proposals refused the French nomenclature. In figure 4 the title of the table evidences the designation of Portuguese Decimal Metric System. However the unit metre was not contemplated. Ancient names were proposed again: *vara* for length, *canada* for capacity and *libra* for weight. We must give attention to the different designation for the length fundamental unit, with its magnitude equals to the metre.

Mappa Expositivo do Systema Metrico-Decimal Portuguez.

Denominações	*Dimensões*		*Expressões arithmeticas*
	PRIMEIRA CLASSE.		
	Medidas de comprimento — Unidade a vara.		
Legoa	Dez mil varas		10,000,
Milha	Mil varas		1,000,
Astil	Cem varas		100,
Aguilhada	Dez varas		10,
Vara	Decima millionesima parte do quarto do meridiano terrestre		1,
Decimo	Decima parte da vara		0,1
Centessimo	Centessima parte da vara		0,01
Millesimo	Millessima parte da vara		0,001
	SEGUNDA CLASSE.		
	Medidas de capacidade — Unidade a canada.		
Liquidos	*Seccos*		
Tonel	Moio	Mil canadas	1000,
Barril	Sacco	Cem canadas	100,
Alqueire	Alqueire	Dez canadas	10,
Canada		Cubo do decimo da vara	1,
Decimo		Decima parte da canada	0,1
Centessimo		Centessima parte da canada	0,01
Millesimo		Millessima parte da canada	0,001
	TERCEIRA CLASSE.		
	Medidas de peso — Unidade a libra.		
Tonelada	Mil libras		1000,
Quintal	Cem libras		100,
Arroba	Dez libras		10,
Libra	Peso de uma canada d'agua destillada, no maximo da sua densidade		1,
Decimo	Decima parte da libra		0,1
Centessimo	Centessima parte da libra		0,01
Escropulo	Millessima parte da libra		0,001
Decil	Decima millessima parte da libra		0,0001
Centil	Centessima millessima parte da libra		0,00001

Figure 4. Portuguese Metric-Decimal System - proposal presented in 1849

[14] Silva Lopes, J.B. (1849): *Memória sobre a Reforma dos Pesos e Medidas em Portugal segundo o Systema Métrico-Decimal* (Lisboa: Imprensa Nacional).

The former complex but inevitable decision in order to adopt the Decimal System initially influenced hard work which was done very quickly. The first set of all the standards were done. However, in the civil war scenario that followed and with the consequent political change, that challenging intention of change had disastrous consequences. Without the old standards sent to Lisbon or Coimbra to be compared and also without the new standards generalised, the confusion and disorder in the ambit of measures augmented in all the territory.[15]

However, at the same time, with this great confusion, we can interpret it as an impulse to adopt the French Metric System in order to solve the problems caused by the (only) apparently bizarre Portuguese System of Weights and Measures, which perplexed the people in lands, fairs and markets and in all commercial transactions and other situations involving measurement.

However, or as a consequence of that, practically until the middle of the 20th century, ancient measures dominated with their regional differences among the units, never definitively solved in the standardisation efforts and governmental orders. What we know is that old names persisted until nowadays, maybe due to the reluctance concerning the new proposed designations or due to a country socially centred in a poor and closed agricultural system. By the end of the 20th century, people still used largely the ancient names but they knew their approximate equivalence to the metric system, especially concerning capacity units.[16]

(3) Portuguese formal adoption of the Metric System

After the civil war, the better solution for the Portuguese government, under the reign of the Queen Maria II, was the immediately adoption of the French Metric System, directly imported to be used. In 1852 on December 13, a Decree in Law imposed the full adoption of the Decimal Metric System in Portugal, with its original nomenclature. This law for the adoption of the "legal French metre as the base for the legal Portuguese nomenclature of weights and measures as well as their multiples and submultiples" was an initiative of the ministry Fontes Pereira de Melo.[17] He also created a Central Commission for Weights and Measures with consultative competences and with the mission to coordinate the organization of expositive tables relating new and old units and also to watch for the construction of the new standards. As before, a Decree in Law imposed the obligatory teaching of the Metric System in Primary Schools and also that the assessment to be Primary Teacher must to oblige its knowledge. It was established a period of 10 years to the complete adherence.

The first Compendium including the new system for Primary Teachers was written and published in Lisbon 1856, by Fradesso da Silveira, official of artillery and Professor in the Polytechnics School of Lisbon. He was named First General Inspector of Weights and Measures of the Kingdom.

The compendium he wrote was commanded by the government, but its publication was completely supported by himself. Curiously, the government orders its free distribution by all the Primary teachers.

However, the character of obligatory use of the Metric System was imposed by decree only in 1872. In Paris in 1875, Portugal integrated the first contingent of 17 countries, participating and signing the formal approval and acceptance of the Decimal Metric System, adhering to the Metre Convention.[18] In 1900, 35 countries had done its official acceptance of this consistent System.

Despite its tormented course, Portugal was an always present and active member in the Metre Conventions and General Conferences of Weights and Measures and with the needed regularity Portuguese governments promulgate metrological legislation actualising and harmonising national legislation with the International Conferences sanctioned decisions.

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[15] *Cf.* J.H. Fradesso da Silveira (1856): *Compendio do Novo Systema Legal de Medidas* (Lisboa: Typographia do Centro Commercial).

[16] Pinto, A.A. (1983): "Isoléxicas Portuguesas (Antigas Medidas de capacidade)", *Separata da Revista Portuguesa de Filologia*, vol. XVIII (1983), pp. 367–590.

[17] Costa Gomes, J.R. (1942): "A introdução do sistema métrico e a evolução dos serviços de pesos e medidas", *Anuário de Pesos e Medidas*, nº 1, (Lisboa), p. 36.

[18] The Report guided by the idea of the universality of the principles of the French Revolution underline the universal nature of the Metric System: "Le mètre est international. C'est donc une commission internationale qui doit le proclamer aux yeux du monde. *Cf.* Guedj (1988): D. *La Révolution des savants, Découvertes* (Paris: Gallimard, Col. Sciences), p. 140.

The 11th General Conference of Weights and Measures, that took place in Paris in 1960, changed the designation of Metric System into International System of Units (IS). New units of measure integrated this important system with new definitions. The Decree in Law number 427/83, from December, imposed the International System of Units (IS) in Portugal.

The International System is far from to be a universal system of units. The Europe Union recently imposed it to all the members. The time changed effectively and we are convinced that we are nowadays in the real beginning of the adoption of an equalitarian system of units.