

# PRIMARY EDUCATION IN MEDIEVAL CASTILE

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## ABSTRACT

In this paper we make a brief approach to the study of an initial education in Castile during the lower Middle Ages. Knowing some basic subjects like reading, writing and calculus was presented often as a professional requirement, and familiarity with them was valued as possessing real working tools. This learning was possible in very diverse centres, as an additional resource to using a private tutor.<sup>1</sup>

## KEYWORDS

Initial education and training, Basic subjects, Working tools, Learning centres, Private tutors.

## CAPITALIA VERBA

Prima educatio et disciplina, Subiecta basica, Instrumenta laborandi, Scholae, Mentores.

It is a difficult challenge to tackle the subject of primary education in Castile during the Middle Ages, as we know practically nothing about its very existence as such. Moreover, our insufficient data about education before the Late Middle Ages refer to very specific areas, disciplines and social groups which did not affect large spectra of the population in the slightest. The few working schools had been set up to satisfy the needs of the ecclesiastical and noble estates and were practically inaccessible for the rest of the population.<sup>2</sup> However, the resurgence of the towns and cities, the development of trades and commercial expansion generated requirements for education that affected what we would nowadays call primary education and which, in some cases, we must consider as genuine professional training. Many of the men of this “new city” who participated in the increasingly complex network of relations: merchants, artisans, tax collectors... clearly needed better education to carry out their activity, which was becoming increasingly complicated.<sup>3</sup> From this necessity, a specific education arose, purely utilitarian, instrumental and practical aimed at these sectors and which I will refer to, as, during the Late Middle Ages, elementary instruction was a consequence of clear professional necessities.

I focus first on the contents, disciplines and mechanisms used in learning and teaching, then on the sites dedicated to this, as well as on the people directly involved: masters and disciples. The duration of the instruction and the age of access will appear throughout this presentation, as there are very few data available.

## 1. The disciplines: reading, writing and counting

Reading, writing and counting were the basic skills, the first social imperatives that young people had to submit themselves to, while memorising and reciting prayers and parts of the catechism. There is no doubt that these were the first phase of any learning process, including the specifically urban one referred to below. It is obvious that drawing up contracts, receipts, bills of exchange, etc., required this, as did the exchange of commercial information, a very common practice among the new group from the thirteenth century on. Learning these skills was a real necessity,

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1. This paper has been prepared in the framework of the research project HUM 2007-63856, *The transmission of technical and professional knowledge: technical literature in Medieval Spain*, funded by the *Ministerio de Ciencia e Innovación* of the Government of Spain.

2. For teaching in the medieval monasteries of disciplines like arithmetic that constituted the targets for elementary education in the Late Middle Ages, see: Caunedo, Betsabé. “Three Castilian Manuscripts on Mercantile Arithmetic and their ‘problems of alloys’”. *Imago Temporis. Medium Aevum*, 3 (2009): 171-188.

3. Giving young men the chance to learn the techniques of the profession which they would dedicate themselves to in a near future was a target for different urban sectors. Traders at all levels, from retailers to the great international companies, different groups of artisans or tax collectors... formed part of a group which continuously grew between the thirteenth and fifteenth centuries and which demanded specific training that had to go beyond the exclusively private realm although not underestimate it. For this question, see: Caunedo, Betsabé; Córdoba, Ricardo. “Oficios Urbanos y desarrollo de la Ciencia y de la Técnica en la Baja Edad Media: La Corona de Castilla”. *Norba, Revista de Historia*, 17 (2004): 41-68.



a technical-professional requirement, and one valued as a work tool that helped with organising and managing a wide range of affairs and business. According to Antonio Castillo Gómez, it supplied a utilitarian, practical and professional literacy. This was a limited literacy, in which learning, *no era un fin en si mismo, sino consecuencia de un uso necesario o directamente útil*.<sup>4</sup>

### 1.1 Reading

Reading and writing are and were different cognitive processes, and in those times, few people progressed from the former to the latter. Learning to read enough to decipher a text preceded learning to write and required less effort.<sup>5</sup>

The reading method was spelling and syllabication. The sequence began with the recognition and pronunciation of the letters of the alphabet in both forms: upper and lower cases, before moving on to syllabication, first of two, then three letters. Once this had been mastered, the next step was reading words and then ending up with sentences. When the pupil had mastered spelled out reading, the advice was to read manuscripts in bastard secretary alphabet or round handwriting.

This school reading was aloud reading and in the Middle Ages, it was initiated after learning prayers (Ave Maria, the Lord's Prayer) and the Ten Commandments.<sup>6</sup>

Specific short texts, the ABC booklet primers, were used to teach this. In the Peninsula, they were known as: ABCs, alphabets or *becerolos*.<sup>7</sup> Their contents: the alphabet, the syllabary, common prayers and an elementary catechetical synthesis, was very much similar, as corresponds to such an elementary pedagogical instrument. Víctor Infantes has carried out an exquisite edition of the first Castilian primers,<sup>8</sup> some of them criticised in the mid-sixteenth century for their monotony and purpose, even reproached then as intended more for teaching Christian doctrine

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4. "was not an end in itself, but rather the consequence of a necessary or directly useful application". Castillo Gómez, Antonio. *Escrituras y Escribientes. Práctica de la cultura escrita en una ciudad del Renacimiento*. Las Palmas de Gran Canaria: Gobierno de Canarias, 1997: 271.

5. There were people who knew how to read with more or less difficulty, but not to write. Viñao Frago, Antonio. "Alfabetización y primeras letras (S.XVI-XVII)", *Escribir y leer en el siglo de Cervantes*, Antonio del Castillo, Armando Petrucci, eds. Barcelona: Gedisa, 1999: 67.

6. Gimeno Blay, Francisco M. "Aprender a escribir en la Península Ibérica: de la Edad Media al Renacimiento", *Escribir y leer en Occidente*, Francisco M. Gimeno Blay, Antonio Petrucci, eds. Valencia: Universitat de València, 1995: 125-144. On page 130, he analyses a Castilian manuscript from the second half of the fifteenth century conserved in the Library of the Royal Palace in Madrid, that indicates three steps regarding this education: First: teach him the Sign of the Cross and the Ten Commandments in romance language and show him all questions...; Second: IIII or Sunday prayers: Ave Maria, the Lord's Prayer, Credo, Salve Regina...; Third: The ABC, recognize letters both vowels and consonants and joined in syllables, spelling out: ba, be, bi, bo, bu...

7. Viñao Frago, Antonio. "Alfabetización y primeras letras...": 64.

8. Infantes, Víctor. *De las primeras letras. Cartillas españolas para enseñar a leer de los siglos XV y XVI: Preliminar y edición facsímil de 34 obras*. Salamanca: Ediciones de la Universidad de Salamanca, 1998.



than how to read.<sup>9</sup> This close link is mentioned below when talking about the places of learning.

After the primers, some printed writings, loose spreadsheets or string booklets of up to 20/24 sheets (40-48 pages) were also used to teach reading. These printed materials combined teaching with a certain degree of entertainment, without renouncing devout, moral and pious texts. They resorted to singing, versification and dialogue as didactic resources, a very widespread practice which is well-known nowadays thanks to the classic studies by Menéndez Pidal and Rodríguez Moñino<sup>10</sup> and the more recent ones by Víctor Infantes.<sup>11</sup>

The first reading book as such was *El Catón*, a work that had, and also benefited from, a widespread medieval diffusion.<sup>12</sup> To complete this short repertoire of works for initiation in reading, we also have some materials for use with children, both at school and away.<sup>13</sup> The contents of these were of two types: either religious or moral, with advice about behaviour in life, with cases that combined both these educations in the same text. This is what we find in the oldest surviving work, *Espejo de Doctrina*, by Pedro de Veragüe, which presents first a catechism in verse for children, followed by *Trabajos Mundanales*, a set of advice for use in life, covering matters both of good manners and economics, what we would nowadays call a guide for human relations. This mid-fourteenth century work was reprinted in 1520.<sup>14</sup>

9. In 1564, Juan de Robles said that the primers he knew were aimed more at learning the Christian doctrine than at reading: *las cartillas que yo he visto mas se ocupan de enseñar doctrina cristiana que no a leer y en algunas penas sabe el niño las letras y pónole a deletrear en el pater noster [...]*. (“The primers which I have seen try to teach Christian Doctrine rather than learning to read and, in some of them, barely the child knows the alphabet he is put to spelling out the pater noster [...]”). Shortly before this complaint he had himself prepared a primer somewhat more extensive which included some advice to the teacher about the pedagogical development of the method, an explanation of each of the letters, the syllables with words as examples, the way of reading and a gloss of each commandment in the form of a psalmody or prose. Baranda, Nieves. “La literatura del didactismo”. *Criticón*, 58 (1993): 26.

10. Menéndez Pidal, Ramón. *Romancero Hispánico (Hispano-portugués, americano y sefardí)*. Teoría e historia, 2 vols. Madrid: Espasa-Calpe, 1968: II, 185; Rodríguez Moñino, Antonio. *Diccionario bibliográfico de pliegos sueltos (siglo XVI)*. Madrid: Ediciones Castalia, 1970.

11. Infantes, Víctor. “La poesía que enseña. El didactismo literario de los pliegos sueltos”. *Criticón*, 58 (1993): 117-124; and Infantes, Víctor. “De la cartilla al libro”. *Bulletin Hispanique*, 1 (1995): 33-66. Eloy Benito Ruano also published a description in verse of the letters of the alphabet, upper case and lower case, in line with their usual spelling in the latter years of the sixteenth century: Benito Ruano, Eloy. “Una descripción rimada del alfabeto (s. XVI)”. *Scriptorium*, 22 (1968): 51-55.

12. From the end of the fifteenth century until the early seventeenth century there were 15 editions confirmed although Víctor Infantes believes there were many others more: Infantes, Víctor. “El Catón Hispánico: versiones, ediciones y transmisiones”, *Actas del VI Congreso Internacional de la Asociación Hispánica de Literatura Medieval*, 2 vols., José Manuel Lucía Megias, ed. Alcalá de Henares: Servicio de Publicaciones de la Universidad de Alcalá, 1997: II, 839-846.

13. Baranda, Nieves. “La literatura del didactismo...”: 27-28.

14. The work of Veragüe has been studied and had a critical Edition: Piero, Raúl A. del. “Dos escritores de la Baja Edad Media castellana, Pedro de Veragüe y el Arcipreste de Talavera, cronista real”. *Boletín de la Real Academia Española. Anejos*, 22 (1970): 6-79.



## 1.2 Writing

The procedure adopted to reach the necessary skill in this first learning seems to have been fairly similar. It meant constant exercising, imitation with assistance, mechanical repetition to try and imitate graphic models, some samples of writing or *exempla* that first contained the alphabet, then the syllables and, finally, the maxims and phrases with varied contents.

Thus, there were three levels of exercises: individual letters, syllables and words organised into a sentence with correctly formed handwriting. After observing the primers or *becerolos* mentioned above, we can say that the easiest vowels to write methodically were 'i' and 'u,' then 'e' and lastly, 'a' and 'o,' as the latter required more complex hand movements. When the vowels had been learnt, the consonants were introduced. After these, they began to link letters and to write the first words.

After initiation in these graphic exercises, they could continue with calligraphic exercises, in order to reach the final phase, which was to set a purpose for writing, both administrative and accounting management, or to provide varied professional or personal information, or to convey feelings. Moreover, attention had to be paid to the basic organisation of the information, as the receiver of the message had to understand it without asking for explanations. Writing correctly required bearing in mind the purpose of the specific text and the characteristics of its target reader. This was a complex task and very few people managed to reach this level.

Learning to read and to write were not simultaneous processes.<sup>15</sup> Writing came afterwards and it seems that it did not start until the pupil could read acceptably. Moreover, writing required more time and effort, and a higher investment, as the material required was costly: quills, ink, inkwells and especially, a lot of paper. Aurora Egido collected some commentaries about this process following the instructions of Luis Vives that, although from the sixteenth century, should not, I think, be very different from the instructions in earlier times.<sup>16</sup> For example, he emphasises how the children or anyone learning to write had to take care that the words were straight, and the letters neither uneven nor unclear. We are given examples of how to set margins, mark the interlineal distances and indicate the distinct body of each letter. He also describes the instruments used: goose or hen quills (the most widely used at that time), as well as how to cut, use and hold them. The pupils watched over

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15. Viñao Frago, Antonio. "Alfabetización, lectura y escritura en el Antiguo Régimen (siglos XVI-XVIII)", *Leer y escribir en España. Doscientos años de alfabetización*, Agustín Escolano, ed. Madrid: Fundación Germán Sánchez Ruipérez-Pirámide, 1992: 45. It seems that the simultaneous learning of reading and writing did not become common until the nineteenth century.

16. Egido, Aurora. "Los manuales de escribientes desde el siglo de oro. Apuntes para la teoría de la escritura". *Bulletin Hispanique*, 1 (1995): 67-94. In the work by Vives, *Diálogos*, there are different commentaries about the art of reading and writing and also in his work, *Tratado de Enseñanza*. A brief sample of these can be found in: Esteban Mateo, León; López Martín, Ramón. *La Escuela de las Primeras letras según Juan Luis Vives: Estudio, Iconografía y textos*. Valencia: Departamento de Educación Comparada e Historia de la Educación, 1993.



each other in the stroke of the letters, the cutting of the quills and other necessary actions, the best of them helping to teach the newer ones.<sup>17</sup>

### 1.3 Accounting

Basic notions of calculation were the last stage of what we are defining as the school curriculum in primary education.<sup>18</sup> It was the longest, most arduous and complicated task, as in this field, over the previous challenges, the instructors had to face an extraordinary novelty. I am referring to the large-scale introduction of the Indian system of numerals and the positional system on base 10,<sup>19</sup> which would prevail in the western world given its enormous operational advantages, which we know well nowadays.

The study of accounts was structured into a series of stages that were explained consecutively but independently. It began with the knowledge of the numbers and their written depiction in what was for many the only phase. First, from 1 to 9: 1, 2, 3, 4, 5, 6, 7, 8 and 9. Then came 10, the most difficult theme as this numeral is composed of two digits, 1 and 0, and 0 did not exist in Roman numeration.<sup>20</sup> An explanation was always given about this 0, considered a special symbol and highlighting that on its own, it had no value, but with one or more symbols placed before it, it acquired a high value.

After this first stage and having learnt the ten numerals or digits, the value of the position was explained, that is that the digits changed their value depending on their position in the written number. Thus from right to left, the first position corresponds to the units, the second to the tens, then the hundreds, the thousands, the tens of thousands, the hundreds of thousands... The position of each digit as we move from right to left, tells us its relative value, and that is why this is called a positional system. The base of the system is 10. Ten units of any order form a unit of

17. Egido, Aurora. "Los manuales de escribientes...": 70-71. She also indicates that from the sixteenth century on, manuals by Hispanic scribes who followed the Italian example began to proliferate.

18. Although it lies out with this theme, we must mention the excellent and broad overview of European mathematical training presented by: Hoyrup, Jens. "Mathematics Education in the European Middle Ages", *Handbook on the History of Mathematics Education*, Alexander Kart, Gert Shubring, eds. New York: Springer, 2014: 109-24.

19. This was a major contribution by the Muslim mathematicians, who also set again for the discipline a practical purpose, applying it to various situations of everyday life that required quantitative results. They typified a type of accounts and its denomination, mercantile arithmetic, examples of which were shown in their manual *Liber Mahameleth*. Some of its best examples can be found in the Iberian Peninsula. A good token of it is a Latin version of the manual from the second half of the twelfth century attributed to Johannes Hispalensis, which has been studied by Professor Jacques Sesiano. There are references of it in: *El arte del Alguarismo. Un libro castellano de aritmética comercial y de ensayo de moneda del siglo XIV. Edición y Estudio*, eds. Betsabé Caunedo, Ricardo Córdoba. Salamanca: Consejería de Educación y Cultura, 2000: 30-33.

20. In the first Castilian manual of mercantile arithmetic, *El Arte del Alguarismo*, the author considered the 0 a special symbol. He gave it the category of *çifra* and made notes that this *çifra* by itself had no value, but when one or more digits were placed before it, it acquired a high value, which apparently puzzled the author himself, and led him to assign to the digit the category of *çifra* (*cyfer, code, mystery*).



the immediately superior order. Ten units make up a ten, ten tens make a hundred, and ten hundreds make a thousand... It was much stressed that the new system was based on two principles: ten as a base for the system and the position.

It was also explained how the system of position regulates the writing of numbers. The digits are placed one after the other on a line, given the direction of reading. Any sequence of digits represents a number and only one, and reciprocally, any number is represented by a sequence of figures and only one. This scripture has the additional advantage that the longer the sequence, the bigger the number, and vice versa, which enables a quick and easy comparison. For example, 1001 is longer than 888 and is bigger. If we compare this with traditional Roman numbers, it has an important advantage: in the latter system, 1001 is written MI (with a length of two figures), and 888, which is smaller, is written DCCCLXXXVIII (twelve figures in length).

### 1.3.1 Learning the fundamental arithmetical operations

After explaining the decimal system of numeration, the basis for understanding the fundamental operations, these were presented: addition, subtraction, multiplication and division, the four rules, as they were named in those times. The proportional distribution, rule of thumb and fractions were only dealt with at a higher level, or in specialised education such as mercantile instruction, given the enormous use the professionals made of these.

The beginning was always to clarify what types of action were associated with the operation studied, so that the pupils could understand what this operation was for. So, for example, in the case of addition, it was explained that it was used to combine various quantities into one. The procedure was the same as nowadays, but the + sign was not used. It seems that this and the - sign, the simplest mathematical signs, were not used until the late fifteenth century. Until then, words were used to express the relation between the numbers and their operation. This competed with the signs throughout the sixteenth century, until the latter prevailed due to the French algebraists.<sup>21</sup>

Subtracting was *amenguar, sacar un cuento de otro*.<sup>22</sup> The importance of the column position of the numbers was emphasised. The lesser one had always to be placed below the greater one.

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21. Crosby, Alfred W. *The Measure of Reality. Quantification and western society, 1250-1600*. Cambridge (UK): Cambridge University Press, 1997: 117, mentions the origins of the mathematical symbols as being obscure. The simplest ones, + and - first appear in print in Germany in 1489. They are attributed to Johann Widman. The = sign seems to have been an English invention, by Robert Recorde, in the sixteenth century. The origin of the signs, \* and: for multiplication and division is even more complicated. They appeared in medieval manuscripts, but first had other functions. See the work by: Cajori, Florian. "Historia de los símbolos matemáticos", *A History of Mathematics*, Florian Cajori, ed. New York: Philosophical Library, 1980.

22. "Subtract, take one account from another". *El Arte del Alguarismo...*: 135.



After explaining addition and subtraction, the next step was to teach the pupils to check that the operation had been done well. This check also showed that addition and subtraction were opposite operations.

Multiplication was considered a repeated sum, “2 times 2 are 4, 3 times 3 are 9 and four times 4 are 16 [...]” Although the sense of the operation was explained, in this phase, the memorisation of multiplication tables, *tablas de coro*, (“choir tables”) prevailed. There was a distinction between the *tabla menor* (“lesser table”) and the *tabla mayor* (“greater table”). The first nine numbers made up the *tabla menor* and, besides the nine numbers above, the *tabla mayor* also presented the larger numbers: 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 29, 31, 33, 37, 41, 43, 47, 51, 53, 57, 59 and 61, which they also memorised. The results of multiplying numbers greater than 10 also appeared, beginning with units times tens, continuing with tens times tens, tens times hundreds, hundreds times thousands and concluded with hundreds times hundreds. After memorising all these tables, the pupils were shown how to multiply other quantities by different methods.<sup>23</sup>

Division is the opposite operation to multiplication, and its purpose is to find the number of times that a given number contains another. [...] *e partir es dicho asy, como quien dis partir 4 cosas a dos partes e viene a la parte 2 e partir 6 cosas a 2 partes e viene a la parte 3.*<sup>24</sup> This is called *partir*, ‘to split.’ It was considered that to do these operations, it was necessary to have prior strong knowledge of how to add, subtract and multiply.

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23. The method that ended up prevailing was the so-called *de la ala* (‘wing method’), considered the most common in the early sixteenth century and which we continue to use nowadays; but there were other methods used. *Has de saber que ay muchas maneras de multiplicar, pero dos maneras solamente quiero poner en este capitulo y la practica dellas y cómo se llama cada una manera. La primera se llama multiplicar de la ala y es la más común y usada multiplicación entre todos los mercaderes por todas partes de los cristianos y llámase de la ala por causa que fecha la operación y su suma quedará la figura de aquella operación así como una ala. La segunda manera se llama multiplicar morisco que es el modo y uso de los moros, la qual manera de multiplicar es la más sana y la más segura, en cara que entre los mercaderes cristianos no se usa porque no la saben, ca si la supiesen otra manera no usasen [...]* (“You must know that there are many ways to multiply, but I only want to put two ways in this chapter and the practice of these and what each one is called. The first is called ‘wing multiplication’ and it is the most common and widely-used multiplication among all the merchants in all Christian parts and it is called ‘wing’ because the operation is done and the result appears in a wing position. The second way is called Moresque multiplying, which is the method used by the Moors, and which is the easiest and safest but it is not used by Christian merchants because they do not know it, because if they knew it they would use no other [...]”). Biblioteca Nacional de España, Raros, 9124, f. 31r. See: Caunedo, Betsabé. “Un manual de aritmética mercantil de Mosén Juan de Andrés”. *Pecunia*, 8 (2009): 83. In: *El Arte del Alguarismo...*: 137-141 (ff. 9r-14v): *las cartillas que yo he visto mas se ocupan de enseñar doctrina cristiana que no a leer y en algunas penas sabe el niño las letras y pónole a deletrear en el pater noster* (“The primers which I have seen try to teach Christian Doctrine rather than learning to read and, in some of them, barely the child knows the alphabet he is put to spelling out the pater noster [...]”), which is an earlier textbook, other methods are explained. We do not consider those as adequate for a primary education.

24. “and divide is called so, as say divide 4 things into two parts and each part comes to 2 and divide 6 things into two parts and each part comes to three.”. *El Arte del Alguarismo...*: 140-141 (f. 14r). Then the book becomes more complicated with larger quantities. It chooses the example 144 divided by 12. 144 is the number to divide and 12 is the number of parts. It places the numbers on the sheet and then describes the procedure to be followed. Concerning the procedure, the operational systematic is similar but the placement of the partial results is not the same as presently, and so it is difficult, the least to say, to keep track of the sequence of operations in the numbers written down. According to the author, *es la más*



In specialised education such as mercantile education, the cycle was closed with the other operations: fractions, rule of thumb and proportional apportionment, as well as a wide repertoire of practical cases very well adapted to the world of trade, as they addressed journeys, prices of merchandises, interest and exchange rates, apportionments..., situations very similar to what they would find in their work, and which nowadays, with the necessary adaptations of time and place, we still find in the manuals of elementary mathematics for teaching basic arithmetic.<sup>25</sup>

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*noble e la mas sutil e mas provechosa del arte del algarism.* ("it is the most noble and subtle and productive part of the 'algarism'"). *El Arte del Algarismo...*: 140-1.

25. *Syete romeros van a Roma e cada // uno lieva 7 servientes e cada serviente 7 canastas y cada uno 7 fogaças y en cada uno 7 cuchillos y en cada cuchillo 7 vaynas y en cada vayna 7 dineros, agora me di ¿quántos heran los romeros? agora me di ¿quántos heran los servientes e las canastas y las fogaças y los cuchillos y las vaynas y los dineros todo fecho una suma? multiplicando de 7 en 7, para bien mientes al multiplicar desta cuenta que as de multiplicar de 7 en 7 e di asy, 7 vezes 7 son 49 e después di 7 vezes 49 son 343 e después di 7 vezes 343 son 1401, desta guisa faz fasta en 7 sumas e todas estas sumas ajúntalas en uno asy como aquí están.*

7 son los romeros  
49 son los sirvientes  
343 son las canastas//  
2401 son las fogaças  
16807 son los cuchillos  
17649 son las vaynas  
823543 son los dineros  
suma. 959799 dineros

("Seven pilgrims are going to Rome, and each one has 7 servants and each servant, 7 baskets and each 7 loafs and in each 7 knives and in each knife 7 sheaths and in each sheath 7 coins, now tell me how many were the pilgrims? Now tell me how many were the servants and the baskets and the loaves and the sheaths and the coins all added? Multiplying by sevens, you are right to say that multiplying in this manner you must multiply by sevens and therefore say 7 times 7 is 49 and then 7 times 49 is 343 and then 7 times 343 is 1401, and in such manner do all 7 additions and all these add in one, written down as shown here.

7 are the pilgrims  
49 are the servants  
343 are the baskets  
2401 are the loaves  
16807 are the knives  
17649 are the sheaths  
823543 are the *dineros*  
addition. 959799 *dineros*.)

Problem n. 144 of *El Arte del Algarismo. El Arte del Algarismo...*: 202.

*Faz esta cuenta, dos troteros salen de Sevilla e quieren yr a Roma e salieron anbos en uno y el uno anda cada día 50 millas y el otro anda el día primero una milla y el otro día anda 3 millas y el otro día anda 5 millas y el otro día anda 7 millas y el otro día anda 9, asy que va acreçentando cada día 2 millas. Demándote ¿en quántos días alcançará al que anda 50 millas cada día?. E tu debes dezir, quantas millas el // primero anda cada día, en tantos días alcançará el que va en pos del primero, ca el anda 5 días e cada día 50 millas e di 50 veses 50 son 2500 y el que va en pos del anda quanto es de uno fasta 50 por menudo, que son 5 vezes 50 que son otros 2500, asy que lo alcançará en 50 días.* ("Do this account, two trotters leave Seville and want to go to Rome and both leave at the same time and one travels 50 miles every day and the other travels one mile the first day and the next day he travels 3 miles and the other day 5 miles and the other day 7 miles and the other day travels 9, thus increasing every day 2 miles. I ask you; in how many days will he overtake the one which travels 50 miles each day? And you must answer, the number of miles the first travels every day, the same number of days will it take the second to catch him up,



We also find examples of problems without numbers, which they called recreational arithmetic and that we still repeat nowadays.<sup>26</sup>

The problems were presented in two parts: the statement or approach and the calculations that led to the solution. The statement itself was also divided into two parts: a description of the situation where the data and conditions to be complied with were presented, introduced by sentences like *fas esta cuenta*,<sup>27</sup> and then the question itself presented by expressions like *agora dime, agora pregunto, demándote*.<sup>28</sup>

We find a total dominance of written text even during the resolution of the problem, when a detailed description of the operations was done [...] *di 4 e 3 son 7, sácalos de 12 e son 5 que fincan*<sup>29</sup>; e *tu debes multiplicar 7 en 7, que son 49 e después multiplicar 7 en 10 que son 70*.<sup>30</sup>

The basic aim of using the knowledge acquired in similar circumstances to those in which it was acquired is also reflected in the statement of the problems with expressions such:

*e asy faras otra cuenta, e como esta cuenta feziste asy farás todas las otras quantas que desta manera sean, e segund esta cuenta se fizo se fara otra qualquier semejante desta [...] E como esta cuenta feziste, asy farás todas las otras cuentas que desta manera vinieren e fueren,*<sup>31</sup>

*[...] o [...] e por esta regla faras todas las otras semejantes a estas.*<sup>32</sup>

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because the first travels 50 days and 50 miles each day and you say 50 times 50 is 2500, and the one behind advances from 1 to 50 in steps of 1 per day, that is 1 into 50, which means 50 times 50 which is 2500 again, so it will catch up the first in 50 days"). Problem n. 44. *El Arte del Alguarismo...*: 163.

26. *Faz esta cuenta, un ome bueno levava una cabra e un lobo e un faz de yerva y a de pasar un rio en que // ay un barco y aquel barco no puede pasar más pasar de dos cosas o él y el lobo o la cabra o la yerva, demand ¿en qué manera lo pasó que no comiese el uno al otro?, e tú debes desir, que él pasó primero la cabra e dexóla del otro cabo e después tornó por el lobo e pasolo e dexolo del otro cabo e tomó la cabra e tornola al otro cabo do estava primero el lobo e después pasó la yerva e dexola del otro cabo con el lobo e después tornó a pasar la cabra y asy los paso todos 3.* ("Do this account, a gentle man carried a goat and a wolf and a bundle of grass, and he must cross a river in which there is a small boat and that boat can carry no more than two things, he and either the wolf or the goat or the grass, I ask how did he cross so that one thing did not eat another? And you must answer that he crossed first with the goat and left it on the other bank, and then went back for the wolf and he crossed with it and left it on the other bank and he took the goat and crossed back to where the wolf had been and then he crossed the grass and left it on the other bank with the wolf and then he went back to get the goat and thus he crossed all 3"). Problem n. 149. *El Arte del Alguarismo...*: 204.

27. "do this account". Problems 35,36,37. *El Arte del Alguarismo...*: 160-161.

28. "now tell me,". *El Arte del Alguarismo...*: 156. "now I ask,". *El Arte del Alguarismo...*: 234. "I ask you to tell me". *El Arte del Alguarismo...*: 161-2, 241.

29. "say 4 and 3 are 7, take this from 12 and it is 5 remaining". *El Arte del Alguarismo...*: 160-61.

30. "and you must multiply 7 by 7, that is 49 and then multiply 7 by 10 which is 70". *El Arte del Alguarismo...*: 170.

31. "and so you will do a calculation, and the same as you did this calculation will you do the other calculations which are in this manner, and as this calculation was done so any other calculation similar to this one [...] and as you did this calculation, so will you do all other calculations which come and are in this manner". Problem n. 93. *El Arte del Alguarismo...*: 177. Practically all the problems of *alguarismo* (algorithm, arithmetic) include this type of expression.

32. "[...] or [...] with this method will you do all other accounts similar to this one". Caunedo, Betsabé. "De Arismetica". Un manual de aritmética para mercaderes". *Cuadernos de Historia de España*, 78 (2003-2004), 35- 46, especially 44.



Some didactic resources used in this education, noticeable after a careful reading of the abacus manuals, are as follows:

- All the problems stated are solved. Statement and result form an integrated entity.
- They usually appear sorted in order of increasing difficulty. First the easiest and, as the pupil progressed, the difficulty also increased.
- Some statements include a generic or specific warning to draw the attention of the reader or pupil. These had a familiar tone, *acuérdate, para mientes, para mientes en este punto, para bien mientes*,<sup>33</sup> *'miébrate'*<sup>34</sup> recalling questions where particular emphasis would already have been placed. They precede the resolution of the exercise and are totally necessary to avoid making mistakes.
- Exceptionally signs, drawings and/or operations are used that give the exercise a special value and clearly facilitate its understanding, memorisation or invite the reader to concentrate on especially difficult cases.<sup>35</sup> There were few of these in the earlier textbooks but they became more frequent as time went by.
- Also, on occasions, we are shown how the result can be verified, encouraging us to check that the operation is correct, *para saber sy estas cuentas se fazen bien fechas e bien çiertas, hase de faser la prueba desta manera*.<sup>36</sup> In the case of this quote, the check also allowed the knowledge already acquired to be reinforced, as this was a check on the result of a subtraction. With the test, it shows that the addition—which had already been explained—and the subtraction are reverse operations. Expressions like, *sy quisieres fazer la prueba, fasla desta manera or e para saber sy esta cuenta es fecha bien fas la prueba como aquí esta asygnada e sy no te saliere tanto, no es çierta la cuenta*<sup>37</sup> are found in the texts of various problems.
- In an attempt to show their notable mastery and skills, some authors show us a double method, presenting two alternative ways to reach the correct solution: *Otro sy, sy quisieres fazer esta cuenta o regla por otra manera [...] and esta quenta misma,*

33. “remember, for memory, for remembrance on this point, for good remembrance”. These are expressions that appear in: *El Arte del Alguarismo...*: 164 (problem n. 49), 170 (problem n. 69), 171 (problems n. 74 and 75) // 183-184 (problem n. 102), 191 (problem n. 118), 194 (problem n. 123), 195 (problem n. 125), 195-196 (problem n. 126) // 187-188 (problem n. 109), 192-193 (problem n. 120) // 202 (problem n. 144, and practically in all the problems in these collections).

34. “remember”. *El Arte del Alguarismo...*: 187 (in problem n. 108): *E miénbrate que qualquier cuenta que ayan de fazer semejante en que ayan maravedís e dineros que lo as todo de faser dineros* (“remember that in any similar account to be done with *maravedí* and *dinero* coins, you must put all in *dinero* [...]).

35. Care must be taken not to confuse the signs of the textbook with those written later by someone else than the author.

36. “to know if these accounts are well done and completely right, the test must be done in this way”. *El Arte del Alguarismo...*: 137.

37. “if you wanted to do the test, do it in this manner”, “and to know if this calculation is well done, do the test as here described and if you do not obtain the same, the calculation is not right.” See, for example, problems 88, 89, 110. *El Arte del Alguarismo*: 174, 188.



*sy la quisieres fazer por otra manera, bien lo puedes fazer,<sup>38</sup> or asy por estos dos modos faras estas e otras semejanτες quantas.<sup>39</sup>*

The existence of these textbooks and the corresponding methodology are evidence of the didactic practice of this new discipline in Castile, which was not an elementary education but nor was it a subject of attention in the universities. We could rather talk about an authentic professional training, resulting like all development of education, from a new social demand, new necessities clearly generated by urban development.

## 2. Schools

In the Iberian Peninsula, we find clearly defined institutions for the first stage of learning, which clearly existed, although it was not based on stable educational institutions. Antonio Castillo Gómez talks about a 'didactic chaos' when he presents the picture of education in the Late Middle Ages in the Peninsula and insists forcefully and precisely on the non-existence of a single model of learning. Learning was adapted to the demands of each moment, with several variants at the same time.<sup>40</sup> Gimeno Blay also insists on the lack of a single model.<sup>41</sup>

What we could call private initiative dominated. However, it is also true that during the fifteenth century, a certain 'awareness' appeared in the Castilian municipal councils about the necessity for instruction, with the idea increasingly prevailing that intellectual knowledge augmented the qualities of the individual and provided better preparation for the specific activities of his group. This awareness was reflected in agreements for a mixed organisation of the existing cathedral schools, which, despite the diversity of formulae, tended to have a point in common, which is that the civilian power came to manage the financial resources. One of the first examples of this educational policy is from Burgos, where at the end of 1380, a royal privilege was obtained that empowered the local authorities to appoint a lecturer in canon law, paid from royal rents and more specifically from the *alcabalas*, to take care of educating the children of the upper groups.<sup>42</sup> It is not clear if he taught anything beyond reading and writing. Nor is

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38. "Otherwise, if you wanted to do this calculation or rule in a different manner" and "this calculation, if you wanted to do it in a different way, you can do so". Problems number 125 and 128. *El Arte del Alguarismo...*: 195-96.

39. "so in this two manners will you do these and other similar calculations": Caunedo, Betsabé. "De Arismetica' Un manual...": 44.

40. Castillo Gómez, Antonio. "Entre la necesidad y el placer. La formación de una nueva sociedad de lo escrito (ss. XII-XV)", *Historia de la cultura escrita: del Próximo Oriente Antiguo a la sociedad informatizada*, Antonio Castillo Gómez, ed. Gijón: Ediciones Trea, 2002: 179-270.

41. Gimeno Blay, Francisco M. "Aprender a escribir...": 127.

42. Beceiro Pita, Isabel. "Entre el ámbito privado y las competencias públicas: la educación en el reino de Castilla (siglos XIII-XV)", *Pensamiento Medieval Hispano. Homenaje a Horacio Santiago Otero*, José María Soto,



it very clear what education was given in the various schools scattered all over the Crown of Castile, as documented by Susana Guijarro, although, in this case, it points to grammar schools.<sup>43</sup> We find the masters of grammar running these schools, professionals whose situation gradually improved, as during the fifteenth century, different council acts and service books show them holding positions considered of general importance for the towns.<sup>44</sup> This consideration had royal assent, and so we can see how during John II's campaigns against the Kingdom of Granada, the solicitors of the urban sector in the General Cortes (Royal General Assembly) of Burgos in 1430 and Zamora in 1432 requested the sovereign to dispense from sending the council officials and members of various professions to war, including among these *los maestros de gramática e escrivanos que muestran a los moços leer e escribir*.<sup>45</sup> This royal mercy was initially only for 1430, but was extended two years later, after a request from the solicitors, for the duration of the war, except if the Crown's needs became pressing. It is clear that there was a close link between the grammar master and the council scribe.<sup>46</sup>

At the end of the fourteenth century, there was already a certain concern among the public authorities to control somehow the masters of primary education. The earliest references we know of correspond to Henry II Trastámara (1369-1379), who, in 1370 wanted to establish nomination procedures to prevent incompetent masters. The decree was ineffective given the weakness of the monarchy at that time, but it did set an important precedent by submitting the masters to state, not ecclesiastic control,<sup>47</sup> as the latter were clearly trying to intervene. Although some earlier timid examples can be found, the Council of Valladolid in 1322 can be considered as the beginning of real concern about primary education, although in this case, it was in Christian doctrine.<sup>48</sup> In other cases, close collaboration was established between catechism and the children's parochial school where Christian doctrine was taught.

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ed. Madrid: Consejo Superior de Investigaciones Científicas, 1988: 881-885.

43. Guijarro González, Susana. "Los centros de cultura urbana en el siglo XV: las escuelas de gramática castellano-leonesas", *1490 en el umbral de la Modernidad. El Mediterráneo Europeo y las ciudades en el tránsito de los siglos XV-XVI*, José Hinojosa, Jesús Pradells, eds. Valencia: Consell Valencià de Cultura, 1994: 243-256. Also: Guijarro González, Susana. "Las escuelas y la formación del clero de las catedrales en las diócesis castellano-leonesas (siglos XI al XV)", *X Semana de Estudios Medievales. Monasterios, espacio y sociedad*. Logroño: Instituto de Estudios Riojanos, 2000: 61-97, where she gives various data about the intervention of the municipal councils in hiring the masters of grammar.

44. Beceiro, Isabel. "Las vías de acceso a la instrucción en la Baja Edad Media", *Alcalá de Henares y su estudio general*, Antonio Castillo, ed. Alcalá de Henares: Instituto de Estudios Complutenses, 1996: 43.

45. "the masters of grammar and scribes who teach the young men to read and write". Becerro, Isabel. "Las vías de acceso...": 43.

46. This close relation was maintained throughout the Ancien Régime. Laspalas Pérez, Francisco Javier. *La reinención de la escuela. Cinco estudios sobre la enseñanza elemental durante la Edad Moderna*. Pamplona: Ediciones de la Universidad de Navarra, 1993: 28.

47. Kagan, Richard L. "La enseñanza de las primeras letras", *Universidad y sociedad en la España Moderna*, Madrid: Editorial Tecnos, 1981: 53.

48. Sánchez Herrero, José. "La legislación conciliar y sinodal hispana de los siglos XII a mediados del XVI y su influencia en la enseñanza de la doctrina cristiana". *Revista Española de Teología*, 46 (1988): 185.



A good example is the Synod of Toledo in 1480 which requested that each priest have with him:

*otra persona de saber y honesta que sepa, pueda y quiera enseñar a leer, escribir y contar a cualquier persona y especialmente a los hijos de los parroquianos y les enseñen [...] la doctrina cristiana. Y los curas amonestaran los domingos y festivos a sus parroquianos para que envíen a ella a sus hijos.*<sup>49</sup>

This was the creation of the parish schools where, together with reading writing and counting, Christian doctrine was taught by a competent person. The Synod of Jaen in 1492 identified this competent person with the sacristan, although it did not clarify whether the sacristan taught in the parochial school or only in the catechism. In 1497, the Synod of the Canary Islands, repeated in Osma in 1511, clearly talked about the clergyman or sacristan who fulfilled both positions, as teacher and catechist, *clérigo o sacristán que enseña a los hijos de los parroquianos leer, escribir, contar, buenas costumbres, apartarse de los vicios.*<sup>50</sup> Besides the parish school and heedful of the existing diversity, the synods acknowledged the existence of other non-parochial schools of primary education in which they also requested Christian doctrine to be taught.<sup>51</sup> We see the interest of the public powers for a primary education increasing, but this education still depended on private initiatives in all medieval years, in very different modalities. Thus, in various cities, there were centres for primary education and other centres for teaching reading and writing, privately owned, and attended by both children and young people who wanted to learn. There were also disciples who went to the master's house for a certain number of hours and were given the stipulated education individually, or others who through a contract for boarding and learning, lived in the master's house and were provided with food, clothing, accommodation and teaching. Nor was it rare for a boy or youth to serve in the home of a master or other person who knew

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49. "another person of knowledge and honesty who knows, can and wants to teach [how] to read, write and count other persons and especially the sons of the parishioners, and teach them [...] the Christian doctrine. And the priests shall admonish the parishioners on Sundays and feast days to send their sons there". Sánchez Herrero, José. "La legislación conciliar...": 209.

50. "clergyman or sacristan who teaches the sons of the parishioners to read, write, count, good customs, keep away from the vices". Sánchez Herrero, José. "La legislación conciliar...": 209.

51. Sánchez Herrero, José. "La legislación conciliar...": 210. In 1492, the Synod of Jaén stated: *Y si alguna persona pusiese escuela para vezar niños, procure tenerla cerca de la iglesia, para que los niños vayan cada día a ella, o al menos, al tiempo en que se alza y adora el Corpus Christi, y que tales maestros, ante todo, enseñen a los niños la cartilla en que estan los mandamientos, los artículos y otras cosas santas y buenas* ("and if any person would set up a school to instruct children, he must try to set it near the church, so the children go there every day, or at least at the time when the Corpus Christi is lifted and worshipped, and that said masters especially teach the children the primer booklet which contains the commandments, the articles of faith and other holy and good things"). Later, in 1553, the Synod of Calahorra insisted *que los maestros que enseñan a leer los niños una vez cada día les hagan decir en voz alta la doctrina cristiana... una vez cada día* ("that the masters who teach the children to read once a day make them say the Christian doctrine aloud [...] once a day"). Independently of this school, there were discussions in the synods at the end of the fifteenth century and in the sixteenth century about one single catechism.



these arts —for example, a banker— who, in return for his services, provided board and lodging and taught him reading and writing, which was considered a contract of service and learning.<sup>52</sup> In each circumstance, the specific contents of the education contracted were specified, and this could mean from the simplest rudiments of reading and writing, to learning some specific type of writing, or the most complete at this level: learning reading, writing and notions of arithmetic. In the latter case, the operations that the disciple had to master at the end of the period were also stipulated. These grew more complicated with time, although, as we can see, the calculations expected in the mid-sixteenth century were already clearly explained in the above-mentioned *Arte del Alguarismo* from the fourteenth century. Thus, we find examples in which it is specified that the youngsters had to be able to

*contar, las cuatro reglas que son sumar, restar, multiplicar e partir, to contar, sumar, restar, multiplicar, medio partir y partir en guarismo, sumar, restar en llano y reglas de tres con compañía, con tiempo, y sin tiempo, to sumar, restar, multiplicar, medio partir e partir por entero, regla de tres con tiempo y sin tiempo, reglas de oro y plata, and also to sumar e restar e multiplicar e partir e regla de tres e compañías con tiempo e sin tiempo e anejas de fraudes y reglas de a tanto por ciento para redimir tributos.*<sup>53</sup>

These were the specific contents demanded in Seville, very similar to those demanded in Malaga, Cordoba or any other city studied.<sup>54</sup>

Besides all these possibilities, there was also the resource of the private tutor (preceptor particular) working in the family, a method that was mainly used by the wealthiest families<sup>55</sup> and which appears the first that is traceable. There are even

52. A good overview of all these possibilities is offered, for example, by: Sánchez Herrero, José; María Pérez González, Silvia. "Aprender a leer y escribir, libros y librerías en la Sevilla del último cuarto del siglo XV". *Revista de Historia*, 1 (1988): 47-90, especially on 49-50. Also: Gimeno Blay, Francisco M. "Aprender a escribir...": 125-44; and Castillo Gómez, Antonio. "Entre la necesidad y el placer...": 179-270. Isabel Beceiro also presents many examples of the mentioned works.

53. "count the four rules that are add, subtract, multiply and divide"; "count, add, subtract, multiply, divide in parts and with decimals, add, subtracting in plain and rules of thumb with company, with times and without times"; "add, subtract, multiply, divide in half and by an integer, rules of thumb with times and without times, gold and silver rules"; "add and subtract and multiply and divide and rules of thumb with company, with times and without times and rules with percentages to redeem taxes". Álvarez Márquez, María Carmen. "La enseñanza de las primeras letras y el aprendizaje de las artes del libro en el siglo XVI en Sevilla". *Historia. Instituciones. Documentos*, 22 (1995): 85.

54. After studying the *Libros de Repartimiento* of the city of Malaga, María Teresa López Beltrán offers a very comprehensive analysis of the situation of education in the city. López Beltrán, María Teresa. *Educación, Instrucción y Alfabetización en la Sociedad Urbana malagueña a fines de la Edad Media y principios de la Edad Moderna*. Malaga: Universidad de Málaga, 1997; and the Cordobese case was studied by: Escobar, José M. "La educación en Córdoba durante la Baja Edad Media: la enseñanza primaria". *Inbaco*, 5 (1984): 37-44. It does not seem to have been any different in the Crown of Aragon. See for example: José M. Cruselles, who takes us into the Valencian situation. Cruselles, José María. "Maestros, escuelas urbanas y clientela en la ciudad de Valencia a finales de la Edad Media". *Estudis, Revista d'Història Moderna*, 15 (1989): 9-44.

55. It seems that the earliest documented examples in the Peninsula correspond to members of the Catalan bourgeoisie. In 1391, the artisan Jaume Olesa contracted a student to teach his children to read,



records of self-tuition. A. Castillo Gómez mentions this, as do some of the arithmetic textbooks from the epoch, *qualquier que este libro tenga, por si mesmo y sin maestro puede ser buen contador*.<sup>56</sup>

This “didactic chaos” observed when referring to the schools should not prevent us from defining some general characteristics that they shared. The boundaries between parochial and town schools are very confusing, but it is evident that essentially and for all practical purposes, they were very similar; they represented the response of local communities, both secular and ecclesiastical, to the demand for education by different families. Their characteristics were:

- They were small institutions, run by a single master, who, in very exceptional cases, could have had an assistant. Thus, a school corresponded to a single master, one single classroom.
- These were local institutions, financed by the councils, the parishes, by those concerned or by all them. They operated with autonomy and were not subject to any official regulations.
- The school was run by the master, who ran the centre, especially in the pedagogical area. Sometimes they had a contract with the council.
- Most of the pupils contributed to paying the teachers a stipend, which varied from place to place and was related, as mentioned above, to the education agreed: reading, writing and/or counting.
- This huge diversity characterised the organisation of education, although it would be more accurate to refer to lack of organisation, as the concept of school years did not exist in the Middle Ages. There was no set age at which the children had to start school, nor one for finishing. Nor was there a specific time of the year for children to be at school. Thus, they could not be taught with a common programme; each had to progress individually.<sup>57</sup>

Despite its shortcomings, there was a clear concern for the organisation of primary education in late-medieval Castile, a time when all its structural elements were conformed and became visible in the early period of the Renaissance. Thus, it should be no surprise that Juan Luis Vives, one of the representatives of humanism in Spain, a man in the transition between a century finishing and another being born, addresses them in different works.<sup>58</sup> In these works, Vives clearly advocates:

- A public approach to education and the problems regarding its public organisation.

and in 1395, the merchant Antoni Despuig did the same. Castillo Gómez, Antonio. “Entre la necesidad y el placer”...: 192.

56. “anyone who has this book, all by himself and without teacher can be a good accountant”. This statement is at the beginning of the arithmetic textbook by Mosén Juan de Andrés cited in footnote 64. Castillo Gómez, Antonio. “Entre la necesidad y el placer...”: 193, makes some comments about this type of learning.

57. Laspalas Pérez, Francisco Javier. *La reinvencción de la escuela*...: 250, who also shows how the reorganisation of education was favoured by the of the education institutions of religious orders prevailing, these including Jesuits and piarist fathers.

58. All these works are in: Vives, Juan Luis. *Primera traslación castellana íntegra y directa, comentarios, notas y en un ensayo biográfico*, ed. Lorenzo Riber. Madrid: Aguilar, 1947-1948. The second volume contains Vives, Juan Luis. *Las Obras de educación y de reforma de los estudiós*, ed. Lorenzo Riber. Madrid: Aguilar, 1948.



- The rational establishment of schools all over the country.
- The training and selection of the masters.
- Certain advice to the students.

At this point, on the threshold of a new period, we finish this work.

