

# Europe in the World

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The transition from sporadic to systematic commerce can be shown in the local relations of the domestic market as well as in distance trade. The commerce of isolated spots, districts and localities is transformed and linked with interregional and international commerce. The transition from sporadic to systematic commerce is presented in the various branches of the economy and expands from there. The opposed relations of the system of mining, of the hammer mills and smelting system, of coinage, of the assembling of iron tools and of the metal processing industry, of the merchant class, of the printing industry, of the clock industry, of the weapons and war industry, of shipbuilding and of the art of seafaring were systematically elaborated, not only in interregional and international relations to one another, but also in the reciprocal support of the branches of industry among one another.

Instruments of credit, market relations, the exchange of commodities and the circulation of money, wage labour and the accumulation of capital are the practical means towards the transformation of isolated localities into nationally linked localities, towns and provinces. Commerce is operated on an ongoing basis in markets, in the stock markets and banks, in the representatives, subsidiaries, settlements, factories and the like. In this connection the weekly market, the annual market and so on are transformed into department stores and other durable and permanent establishments. Money, paper money, securities, mining shares, letters

and stocks are spread by commerce. The rate of interest is transformed directly with increasing and decreasing risk in the investment of capital.

The question concerning the effect of the discovery of America on the beginnings of the capitalist system was put into the foreground of research in this area by F.M. Feldhaus. In lectures as well, students have again and again highlighted this same question. The answer to it is not simple, for the discovery of America is closely linked with the discovery of the sea passages to Africa and India as well as with the expansion of wage labour in the port cities of southern Europe and of the development of the arts of seafaring and shipbuilding. The sacking of Constantinople by the Turks (1454) constituted a difficulty in this respect, for the Italians in the east of the Mediterranean region still remained active at this time in trading, so that the war with the Turks did not prevent the expansion of wage labour and the further development of technics. The discovery of America (1492) had only a limited impact on the development of capitalism on the Iberian Peninsula. The beginnings of the capitalist system can already be noted in the trade across the Gulf of Leon and the Ligurian Sea, mainly between Genoa and Barcelona, and in connection with the founding of the dockyard industry in Gades (Cadiz). The dockworkers were paid a money wage in the 15th century. Thus, the Queen of Spain, Isabella “the Catholic”, pawned her jewels, in order to finance the ships and the voyage of discovery by Columbus.

And thus, traces of so-called paleo-capitalism in the 15th and 16th century on the Iberian Peninsula were already present. The people of Spain and Portugal had profited but very little from their American colonies in the 16th and 17th century which they had subsequently conquered following their discoveries. Their economy in this period remained paleo-capitalist, and it persisted in this condition through the 18th and 19th century. The economic structures of these countries were not transformed by the discoveries and conquests—on the contrary, they remained bound to their previous condition. German merchants and bankers took over the precious metals which the Spaniards had transported from America and lent them further, again to the Spanish monarchs. In Cervantes’ *Don Quijote*, 1605, *fuca* (=Fugger) meant: *un hombre muy rico*, a very wealthy man. The Spanish kings had lost their riches through the wars of the 16th and 17th century, could not repay their debts, and thus the great trading firms and credit institutes of Augsburg and Nuremberg went bankrupt for lack of money. This sad history, however, pertains only to the fate of single persons. The history of capitalism in general is different.

The structural processes of capitalism are related to the relations of wage labour and capital and were continually extended in Central Europe in the 15th and 16th century. This doesn’t just concern the Augsburgers or the Nurembergers, but rather all the branches of industry, like mining, printing, the clock industry, the metal

industry, the trading firms and shipbuilding. In opposition to these branches of the economy weaving, agriculture and construction which continue the medieval characteristics of their production practices into modern times, appear not to have been progressive, that is, reorganized on a capitalistic basis. In all branches, workers produced their commodities, they were oppressed and exploited, they received their wages, and their technics and skill were further developed. This development was accomplished quicker in Central Europe than in Italy, Spain and Portugal and it was more pronounced in Holland and England.

We recall, for example, the fact that the Russian Czar, Peter the Great, travelled to Holland in the 17th century in order to study the new shipbuilding art there. The Central Europeans, in particular the Germans, in trade and in the production of iron had the edge over the Mediterranean countries, and the Dutch and the English would take it over from the Central Europeans in the 17th and 18th century.

The discovery of America played several roles in the history of capitalism. For the Spanish and the Portuguese, who had achieved a weak development of wage labour and capital, there came a weak expansion of capitalism in the following centuries. A stronger development of wage labour and capital had led to the stronger expansion of capitalism in Germany, England and Holland. The relative weaknesses of Iberian capitalism in comparison to the German, Dutch and English had led to the exploitation of the Spaniards and the Portuguese by the Central and Northern Europeans. These Europeans had treated all the countries of the Iberian Peninsula almost as semi-colonies, while Spain and Portugal could confirm themselves as colonial powers not only in America, but rather in the regions of the Pacific and Indian Oceans as well. Thus, not only was Brazil conquered by the Portuguese, but so too were Macao, Timur, Goa, Mozambique and Angola. And the Spaniards conquered not only Mexico, Peru and other parts of North, Central and South America, but also the Philippines, and Morocco, among others. Portugal and Spain had imported precious and non-ferrous metals from Mexico and Peru, spices, cotton, wood and later sugar, coffee, rum and cocoa from the whole of their colonial domain and forwarded them on.

Colonialism and colonization exerted a reciprocal influence on one another. The great traders, merchants and bankers sent German and other miners into their Spanish operations. Colonization by European workers in the New World went a step further. Unfree labourers from Europe were established in America, later it was the slaves from Africa. The colonial powers led American Indians into slavery and peonage. The peon was a kind of peasant, who was burdened with debt; he could not move freely. Colonization was a means to further develop colonialism in America and colonialism in turn was a means to further develop colonization. The

Basques worked as shepherds along the entire Cordillera in Mexico and North America. The discovery of America by the Europeans had great significance for the first appearance of capitalism and its further expansion, if the entire continent of Europe is taken into consideration. Only its significance is to be evaluated differently. For those capitalists like the German, French, Dutch and the English, who were already on the way to the developing into commercial, mercantile, industrial capitalists, the discovery not only of America but also of the sea routes to Africa and Asia were a progressive occurrence.

In this context it's not only about the entrepreneurs but also and perhaps, above all, about the labourers, who in the town during the capitalist period were exploited more than in the Middle Ages. This increase in exploitation awakened the impression in O. Johannsen and F.M. Feldhaus, also in Johann Janssen and Vilfredo Pareto that the hour of class struggles had struck only with the beginning of capitalism. What these people asserted, is not entirely true, nor is it false. They have only exaggerated their judgment.

Capitalism as a system created more jobs as well as more mental and physical movement for the working class.

Mental activity is closely linked with bodily movement in modern times. People travel to America, Africa and Asia. They discover new sea routes and develop the new arts of seafaring and with them the instruments for measuring time. Peasants set themselves in motion, as do poets, painters, physicians, miners and mathematicians in equal measure.

The discovery of America constitutes a part of these movements. The search for money, the voracious appetite for gold—*auri sacra fames*—, the search for new jobs, the discovery of what is for the Europeans new worlds, the discovery of antiquity and their spiritual riches occur at the same time. At the same time as Columbus had discovered America, Petrarch, Dürer, Vasari, Regiomontan discovered antiquity. At this same time Pacioli, Micheal Stifel and Adam Ries took up arithmetic from India and Persia, and Regiomontan and Albrecht Dürer brought geometry from antiquity and from the Near East to Germany.

For those countries which had attained a weakly developed level of capitalism, the discovery of America did not signify any enrichment, but rather the exploitation of their country by those who had attained a more powerful economic position. Only in the 20th century was Spain able to alter this relationship.

For Central Europe the discovery of America had a deep-reaching effect on the mining industry. The sizeable development of mining in Germany, Austria, Bohemia, Moravia and Hungary did not come to a halt, but was constricted by the importation of American precious and non-ferrous metals. Only the richest mines, like, for example, in Joachimsthal, could survive in competition with Mexican gold,

silver and copper. The poorer European pits containing metals were abandoned. The transition to iron mining followed in the second half of the period. The bituminous coal industry and its connection to iron and steel in a major industrial enterprise was first assembled in the period of high capitalism.

Right at the beginning of the capitalist era the importation of cotton of Mexican and later of North American provenance was of great importance for the production of cloth made of fustian, among others. The importation of new species for planting from America, like potatoes, tomatoes, corn and some types of squash, was undertaken first in the second half of the 18th century and later. Agriculture in Central Europe was fundamentally changed by the planting of potatoes, not so much by tomatoes and corn.

For the Italians corn in the form of polenta, for the Rumanians in the form of mameliga, was an important food; for the Germans on the contrary, corn was not important. Sugar cane was significant as a source of sugar, and drinks made of sugar, syrup and molasses were significant in Central Europe for trade and consumption, not for planting. Cocoa and coffee were likewise imported from America for the preparation of drinks, without exerting an effect on the agriculture of Europe, for these kinds of plants were only suitable for tropical and subtropical climatic conditions.

Persia and India had a large economic significance in the first centuries of the modern bourgeois period for the Dutch and the English, not for the Germans.

Johann Albrecht von Mandelslo and Adam Olearius published their genial descriptions of their journeys in the middle of the 17th century (J.A. Mandelslo *Morgenländische Reyse Beschreibung*. Schleswig 1658. Adam Olearius, *Moskowitische und Persische Reise*. Schleswig 1656). Both journeys were officially compelled, just as the contemporary journeys of Sir Thomas Roe from England. The journey of François Bernier to Mogulistan was not official, but the publication of his book (*Voyages, contenant la description des Etats du Grand Mogol*, 1670) was dedicated to the French minister and mercantilist Colbert. William Methold from England, Joost Schouten from Holland and many other private people published journey books in the 17th century. (See Lawrence Krader, *Die asiatische Produktionsweise*, in: *Antworten auf Bahros Herausforderung des "realen Sozialismus"* Ulf Walter (ed.) Olle und Walter, Berlin 1978, pp. 100–127; idem. *The Asiatic Mode of Production*. Assen 1976; idem. *Il despotismo orientale*. Rom. Enciclopedia della scienze sociale. 1996).

The effects of the travels of Roe, Methold, Bernier, and Schouten were closely bound up with trade. The English and the Dutch founded their East Indian Companies in the 17th century and accomplished many trade voyages. The books of Olearius and by Mandelslo are both literarily appealing, but in practice, the

princes in Germany did not engage in trade with the West. A few colonies, in what is today the State of Pennsylvania, were established by the Germans in the 17th century, however, their impact on further colonization and on world trade was limited and of little significance in comparison to the Dutch, English, Spanish, Portuguese and French enterprises of this kind. It can be asserted that the discoveries in America, Africa and Asia by the Europeans had a mediated and not an immediate effect on the development of capitalism in Central Europe in the early centuries of the modern period. The Italians, Columbus and Amerigo Vespucci discovered America, however, exploitation in further relations to America took place by other countries.

A look beyond the borders of Central Europe will clearly show that the establishment of modern bourgeois society and the beginnings of the capitalist system cannot be imputed to any single country. Many countries, around the same time in Southern, Central and Western Europe, contributed to the fact that the medieval economy and society in the 15th, 16th and 17th century were substantially, although not formally pushed back. The victory of the capitalist system in the formal system of the bourgeois state and law extends across the entire era of the modern period from the 15th to the 20th century. The struggle for the formalities and the defeat of the old prerogatives took much longer and were much more complicated than the rational advance of the economic system. The victory of the new system can also not be imputed to a single historical moment. The liberation of the peasants is an essential moment in this regard, as are the training and the increasing qualification of the working class in the mastering of new machinery. A further such moment is the increase in entrepreneurial activity of the middle class.

All social classes and groups took up the struggle against the old feudal lords and the Church, only it came to pass that some wealthy people from the middle class deserted to the nobility as soon as they could buy title and landed property.

Then all the wealthy people said that the struggle against poverty was not their affair but rather that of society, the Church and the state as a whole.

The various authorities, which we have cited, give emphasis to various single factors in the transition from the old to the new system of economy and society. Weber together with Kulischer, names in this regard the Protestants, Sombart the Jews and together along with them Brentano, von Below and Schumpeter, the entrepreneurial class. What they have contributed is not false—but in each case insufficient. Regarding the treatment of the problem of transition, Marx had recommended some moments, for example, the expulsion of the peasants from the land, among others. Other moments, such as the class struggles and the movement of liberation of the peasants, on the contrary, he left out.

The transformation of feudalism, of fiefdom and of the medieval church had caused great suffering and devastation in the life of the people. The religious wars of the 15th and 16th century in Bohemia, Germany, France, the Netherlands and Spain, of the Sacco di Roma in the year 1527, the Thirty Years' War and the expulsion of the Huguenots from France were not isolated but rather reciprocally determining events. Max Weber steered attention to the Protestants in the founding process of the capitalist epoch. Protestants in the middle class led commerce in the domestic market and in foreign trade, and the Calvinists among them accumulated capital through their thrift. The middle class was not only strengthened by Calvinism in Germany but rather also by the Huguenots. The latter emigrated from their stronghold in La Rochelle and in Nantes in Western France to settle in England, the Netherlands and Germany. They advanced qualified labour in the textile industry, in the metal processing industry, in the merchant class and in commerce, in the working class as well as in the middle class. The nobles among the Huguenots had joined the German nobility. France lost much through its politics, and capitalism in the 17th century was not driven by the men of state after the expulsion of the Huguenots, but rather was guided by them. This double-sided activity in the French economy had drawn to it the attempt from the side of such men of state as Colbert to engage the merchants in service to the interests of the state.

From the side of the state and statesmen this attempt found its expression in mercantilism. The weaknesses in the development of capitalism in France during the 16th and 17th century, resulting from the expulsion of the Huguenots, were damaging—loss of trained labourers, particularly in the textile enterprises and in the metal industry, and losses in the merchant class. Mercantilist politics followed in their train. Adam Smith had sharply criticized both political practices in the 18th century, yet the politics of the economy of *dirigisme* remained powerful in France.

The peasant uprisings in England in the 14th century and the civil war in the 17th century contributed much to the establishment of modern bourgeois society and of the capitalist system in that country. Both moments will not explain everything, but they played a large role in the development of the capitalist economy and of bourgeois politics. To this is to be added the activities of the German mine manager (Anglice Barmaster), the resettlement of a branch of the French Huguenots, the admittance of the Jews by Oliver Cromwell and the great wave of colonization and colonialism in North America, India, the West Indies and elsewhere. All these factors, together with the wealth in iron and hard coal, with the training of the working class and technical developments, led to the Industrial Revolution of the 18th and to high capitalism in the 19th century.

Capitalism was established by the total activities of the peasants, the town working class and the entrepreneurs. These activities were carried out not through the common consciousness, but rather separated in the various social classes in the different countries. Thus, one cannot speak of a unitary revolution but rather of several waves of activity independent of one another. The linking of the aspirations for wage labour, for capital, for freedom and equality was taken up sporadically in the 15th and 16th century, systematically as capitalistic activities, as wage labour and accumulation of capital in the 18th, 19th and 20th century.

The connections between districts and localities as well as between industries and their branches were strengthened with increasing intercourse in modern times through the spread of literacy and of the art of printing and through the unification of the universal legal system. It is here that the social and economic foundations for the system of the nation states of modern bourgeois society are to be found.

The economy raised its productivity, the sum of products, the wealth of society and the variety of that which was produced.

The capitalist system did not solve the problem of poverty but treated it in two ways. First, poverty is recognized as a social problem, and civil society as a whole, not the Church on its own, is challenged to solve it. Second, and primarily the problem of poverty in bourgeois society was parried by pushing it, sweeping it first and foremost into the deprived areas of the town and into the colonies.

Since the epochs of the colonial victories and of high capitalism from the 18th to the early 20th century the Europeans arrogantly over-estimated their position in the human world. Yet, this was not always the case. In antiquity, the Celts, Germans, Slavs and other peoples of Europe were considered by scholars in the Eastern Mediterranean as primitive, so to speak. They were unable to read or write. In the early Middle Ages, this rough assessment had not essentially improved. Only in the late Middle Ages with the increase in commerce, and to some extent of production and the money economy as well could this situation be changed. In the interim, the Islamic powers broadened their capacities and finally overtaxed them.

When the Europeans had retreated after the defeats in the Crusades, the Muslim conquerors surrendered the Iberian Peninsula, Sicily and large parts of the Balkan region. Yet military-political superiority in this case was insufficient. In Spain, the Islamic epoch in architecture, in art and in science was resplendent in world history, the impact of European culture on the Near East in the Crusades was, on the contrary, really meager. By means of this comparison the judgment can be made how low Europe stood in art and science and as a world power to the beginning of the modern period.

The mathematical sciences in their history had a close tie to the merchant class, to labour in the workshop as well as to statecraft, for instance in the collection of

taxes and in the art of war. Dürer applied geometry to sculpting and the architecture of the fortress, Leonardo da Vinci to the same and to water canals. We do not follow the historical course of these great events further, but rather sketch developments in mathematics in connection with economic and cultural history. European mathematics was at first dependent on the mathematics in the Near East. Leonardo da Pisa (also called Fibonacci or Bignolli) had made business trips to Egypt, Syria and Algeria, where he had learned the Indo-Arabian numerals and written and disseminated the books *Liber abacci* (1202) and *Liber quadratorum* (1225). They were not books, in our sense, but rather in the medieval one. He also published his *Practica Geometricae* and a book on mathematics, which he entitled *Flos*. In these books he employed equations and solutions with unknowns to the calculation of debts with negative solutions, that is negative numbers. He also mastered the quadratic as well as some diophantine equations. His mode of treatment is traced back to the methodology of al-Khwarizmi, to that of the Hebrew *Misnat ha-Middot* and further to the work in Sanskrit of Brahma gupta and Aryabhata. This mathematical tradition was concerned with questions regarding the calendar, with the movement of the sun and the moon in relation to the reckoning of space and time and with the beginnings of algebra and algorisms (see Al-Khwarizmi, above). Terminology and calculation were in this mathematical tradition rhetorically executed; concrete questions were solved; pure mathematical notation was not yet developed. Al-Khwarizmi's main questions are related in one book to the distribution of inheritances. The astronomical tables were continued by him.

Leonardo da Pisa had further developed those kinds of mathematical treatment and their results; his accomplishments were recognized by the city of Pisa with a sum of 20 pounds annually and sundry emoluments. In mathematics and in the history of the merchant class he remained, however, a singular phenomenon. He had no immediate successor, and practices in mathematics, in the merchant class and in statecraft of the 13th and 14th century were not essentially changed through his great knowledge and contributions, let alone developed. Master Dardi of Pisa was active at this time (1344).

Only in the 15th century, through the Florentine Masters, Master Benedetto, Master Biaggio and Master Antonio Mazzinghi, did it come to a stirring development in arithmetical practice, not, however, in the theories.

Great progress in this connection was made by Luca Pacioli. His work was printed in a book, *Summa arithmetica, geometria, proportioni e proportionalita* in Venice in 1494; it was crowned with great success and appeared in the Italian language with algebraic notation. The work is mainly related to general rules, which were useful not only for the mathematicians, but also for merchants and working people, astronomers, state chancelleries, and so on. He calculated with roots as well

as with quadratic and cubic equations and with unknowns. He had access to the classical Greek and to the Western mathematicians.

It can be asserted, that in contrast to Fibonacci, the impact of Pacioli was closely related to his surroundings. Shortly thereafter, Scipione del Ferro, Tartaglia, Cardano, Ferrari, Bombelli among others came to solutions of the cubic and biquadratic equations in the course of the 16th century. Modern notation was further developed by M. Stiefel, Chr. Rudolff among others, and all of these works were also published in Italy and Germany, so that they appeared as books in the modern sense.

The focal point of this sketch does not rest on the relationship of talented mathematicians, astronomers, merchants and master workers to one another, but rather on the changes and developments in the European economy and society from the 13th century, the time of Fibonacci to the 15th century, the time of Pacioli. Only in the 15th century were the Italians, the Germans and other European peoples of the North and West in the position to understand the new mathematical practices, to apply them to economic practice, to comprehend them abstractly to a certain extent and to develop them further.

The art of printing was widespread at that time in Central and Upper Germany, in Upper Italy and in the Netherlands; commerce, production in mining and in the metal industry, in trade and in the merchant class, education and literacy, science and the art of arithmetic and the fine arts and productivity, in general, grew. Further, circles in northern and southern Europe expanded and deepened their relations quantitatively as well as qualitatively through increasing traffic in the economic and in the intellectual realm. The impact of these developments in economic life, in the arts and sciences are concretized at the end of the 20th century through the desire of the European powers to be recognized as great powers were in the past. Out of irrational grounds reason comes forth.<sup>1</sup>

The shareholders in mining were mostly workers and members of the middle class simultaneously, thus mediators between the process of production and distribution and the authorities. The council was the mediator between the town and authorities as well as between the guild system and town life. Many landowners and aristocrats were active as mediators in this regard, and the authorities in Saxony had inserted themselves on the side of the distributors regarding the new methods in cloth production.

The roles of individuals, whether progressive or reactionary, are complicated and always difficult to measure. Nevertheless, the progression of capitalism and of bourgeois society can first sporadically, and thereafter systematically, be judged objectively. Originally its representatives, such as Dürer, were satisfied with this advance and optimistic with respect to its future, but at the end of the beginning

period Goethe hinted at other paths for humanity than those which his epoch was following.

Capitalism is founded on wage labour and on the appropriation of capital, capital investment and capital accumulation. The same laws of wage labour and capital are valid for the beginning period of capitalism as they are for the present. Capitalists, wage labourers and capital as well as their laws were there in classical antiquity and in the Middle Ages, but not the system and not to the same extent of wage labour and capital as in the capitalist period. Capitalism, modern bourgeois society, the epoch of modernity, which cover one another and fall together, began in the middle of the 15th century in Europe north of the Alps. Capitalism did not arise as a social and economic system and era like a living being or as a divine figure at one time and in one place. Rather it arose as a cultural system at several locations and over a long period of time and out of the relations and contexts of many peoples, towns and natural conditions. The first steps on the road to capitalism were made in the towns of northern Italy, in Venice, Florence, Pisa, Lucca and in Genoa in the 13th to the 15th century. Commerce, banks and production in this archeo-capitalist period were small in their extent; they were operated by the nobility of the medieval kind, like for example, the Duke of Milan, and were guarded by the Church. Money was lent, instruments of credit were brought out, and the lending rate was fixed, but the Church preached against usury. In traffic with the Near East the northern Italians served as mediators at the time. It was here that the important preconditions for the beginnings of capitalism were developed.

For the starting point of the capitalist era, the towns of northern Italy were important in another sense. People of the modern era, like Jacob Fugger, Regiomontan, Albrecht Dürer, Copernicus, Agricola, went there to work and to learn. What followed from this was the expansion, the qualitative reforming and the systematization of the processes of commerce and production, of wage labour and capital in northern Europe.

The beginnings of capitalism are to be traced back to the mutually supporting activities in the different branches of industry, especially in mining, in the processing of metal in the towns, in seafaring, in the printing industry, and in the practices of merchandizing and finance. With some exceptions—to them is reckoned primarily sea travel in the region of the Mediterranean—the operations of commerce, banking, ore, metal, printing and transportation of the early capitalist period were led by private undertakings.

The beginnings of capitalism as a system in Europe on both sides of the Alps are thus to be sought in the cities of northern Italy, Upper Germany, the Netherlands and England, in the mines in the Upper Palatinate and in the Harz region, in the

towns of the printing industry, Mainz and Strasbourg. In this connection it is not about the mercantile and financial undertakings alone. Customarily the history of capitalism is divided into two main epochs, the first of which was designated the epoch of mercantile capitalism down to the 18th century, the following period was that of industrial capitalism. For this attempt at periodization the industrialization of capitalism in the closing years of the 18th and the early years of the 19th century are supposed to be decisive. There was a quantitative difference between the two epochs and we fundamentally agree with this periodization, yet on another ground. We understand that the pivotal element of the transition from the Middle Ages to modern times is the work of mining in the 15th century, which belongs not to the commercial branch but rather to the industrial branch of the economic system. The work of mining is linked with coinage, with money and the circulation of money, the printing industry, with armories and with sea travel. The organization of factories, the division of labour, the steady introduction of new inventions in mining machinery, the buying and selling of mining shares are rather more quantitatively than qualitatively to be distinguished from those in the enterprises of the following epoch in the history of capitalism.

Considered from the cultural-historical standpoint, the capitalist epoch is earth-shaking. The exploitation of the workers is intensified; by contrast the working class was freed from the feudal yoke. The peasants and most of the labourers in the town are to be considered unfree in the Middle Ages. In the modern period labour was expanded. The rights of the wage labourer as a class are related to the freedom and equality of contract and the freedom of movement. Only in the capitalist period did the workers secure these rights for themselves. In classical antiquity and in the Middle Ages the labourers were mainly slaves, serfs, or they were bound in some other way. For the freedom of the working class then, in capitalism, the freedoms of mining served as an example and as a general template. Hereafter the peasants asserted their freedom. The mining works were driven by wage labour and capital at that time.

The processing of metal in the workshops is distinguished in the magnitude of the operations from those in the epoch of high capitalism. In both cases the organization of labour was rationalized; in one workshop various products were produced. Thus, the tinsmiths created not only clasps, but rather also bric-a-brac of brass or simple tin. The bric-a-brac again is not only a plaything, and therefore the work of the great lexicographers Matthias Lexer and Moriz Heyne is to be supplemented here. Lexer (Grimm, *Deutsches Wörterbuch*, XI/I) writes (here concisely presented): “brica-a-brac [*Tand*]: idle talk, also a negligible plaything.” However, the bric-a-brac was for the merchants everywhere in Europe indispensable. With it, they added, subtracted and kept their books. This is the meaning of the

sentence: *Nürnbergger Tand geht durch alle Land* [brica-a-brac from Nuremberg goes through every country]—for the calculation or arithmetic pennies [*Rechenpfennige*] and the bric-a-brac are one and the same.

The ore from the local mining works, its transport into the nearby towns and the processing of metal there did not alone create the foundation for capitalism, but the presence of natural materials, of labour power and labour tradition and of capital was of fundamental significance for its formation.

No less significant was the wood, which was derived from the northern European virgin forest; technics was based on wood in early capitalism. Machinery in mining, in the construction of houses and workshops, ships and carriages, were based on wood; fire for the processing of metal, for the kitchen and heating was made from wood. The virgin forest and the ore of northern Europe served as the material foundation of modern bourgeois society. Cloth was woven out of wool and linen. Cotton was imported from the East; it was increasingly used in the production of clothes made of fustian, a stuff made of cotton and linen.

The great difference between the forerunners of capitalism in the late Middle Ages and the capitalism in the 15th century is to be sought in the extent of economic activity in modern times in contrast to the same in the previous period. The presence and extent of money and of the circulation of money, of the economic enterprises and the discoveries of the bourgeois period have their source in the organization and spread of wage labour and capital. The new industries of printing and seafaring were introduced, the new organization of labour and the division of labour were further developed, and the arable land and the towns were extended. Ore and virgin forest disappeared.

## Note

1. Fibonacci and Pacioli, see: J. Tropfke, *Geschichte der Elementarmathematik*. B.L. v.d. Waerden, *A History of Algebra*, 1985.

