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SUMMARIES

David S. Landes, *The wealth and poverty of nations: some reflections on theory and practice.*

The essays examines how scholars have explained historical gains in labor productivity, since smithian reflections on division of labour until the discovery of the so-called "residual". Finally Kuznets' paradigm of "modern economic growth" centres on change from empirical discovery and innovation to science-based advances of a more systematic character. In practice, however, in spite of theory of convergence it can be observed an increasing gap between rich and poor nations: a gap due particularly to difficulties of technology transfer and the differential role of human capital. Many changes in the relationship between knowledge and development have hurt the chances of poor countries to catch up. Today they lack knowledge: but educational and institutional arrangements are much harder to copy than industrial hardware.

Franca Assante, *Agriculture organisation and innovation: Basilicata and Calabria case histories.*

The essay outlines the difficult process of organisation, that involved two southern regions (Basilicata and Calabria) between the 18th and the 19th century, carried out by a widespread "modernizing frame of mind". The purpose is to understand the relevant changes looking at three significant moments in the period considered. Because of that, the author analyses some indicators typical of the modern agriculture, such as technological innovation, evolution in firm management and product linkages set below, constant research of new adjustments to market contingency changes. Even if the thesis of the author allows to see an integrated process of evolution which underlines linkages and territorial hierarchies towards a modernisation process occurring in agriculture, it shows in both regions the inefficiency of the numerous modernising interventions in playing a pushing function which upsets the balances below the productive structure and affects the whole area.

Fabio Bettoni, *Technological innovation and sharecropping in Umbria between the 18th and the 19th century.*

The essays deals with the evolution of sharecropping in Umbria, and its proceeding between flexibility and rigidity. In the late eighteenth century especially endogenous elements operate in the system. The agrarian accumulation is based upon the labour intensive utilisation of farmer families, but it faces limitations and restraints in the local, environmental and social factors. The labour force availability comes out from the population growth occurring in the country-side. The relevant increase of cultures, especially of cereals and in particular of corn, forbids the introduction of fodder cultivations, the qualitative and quantitative development of farming, and the massive manuring. It is more frequent to carry out tillage and deforestation. In the hillside the practice of first-crop hay rotation every three years is maintained. On the contrary in the plain the every two year rotation of crop-grain, especially corn, replaces the yearly rest. These structural constraints lead to a radical dichotomy between the sharecropping system and the employment of modern techniques. Anyway, in the first half of the 19th century some innovations, consistent with the old structures, occur at least for a part.

Gauro Coppola, *Technological evolution and agrarian structure in low Po Valley in the 16th and the 17th century.*

Agriculture in the low part of the Po Valley shows at the end of the Modern Age a feature fairly defined, with its own elements, characterised by advanced development in irrigation, cereal-zootechnical propensity and well organised system of agrarian linkages. Not always methods and patterns developed in the years to hit the target are really consistent. If irrigation is a strategic element of the agrarian policy, in a first phase, it is less evident the role played by zootechnic and by changes occurred in the cultivation systems. Geographical factors, but also entrepreneurial culture, knowledge, capitals and interests, mark the innovation process.

Giovanni Panjek, *Agronomic progress, productivity and quality. Some considerations on a difficult correlation. Wine in eighteenth-century Friuli.*

The introduction of modern agronomic techniques in the 18th century did not always result in increased productivity. At times the effect was an improvement in quality and a reduction in quantity of what was produced. This is evident, for example, in the production of wine. In Friuli, specialized cultivation of selected varieties of vine, grown by short pruning and tied on dry stakes, increased the alcoholic content of wine by 30%, bringing advantages with regard to both conservancy and the fullness of taste. However, the species of high-quality vine were those that produces less and these were therefore neglected. This was also due to the fact that wine was generally sold at fixed prices which took no account of quality. With regard to the more common species of vine, it is at

present difficult to establish whether a replacing of the traditional "piantata" by the modern cultivation system of vineyards of vines on dry stakes had any significant effect on productivity.

Maria Stella Rollandi, *Tradition and innovation ın a feudal estate of Lunigiana. Matteo Vinzoni at Groppoli.*

The feudal estate of Groppoli in Lunigiana was sold by Ferdinando de' Medici to Giulio Sale, a Genoese nobleman, in 1592. For the next two centuries or so, it was run by Sale's descendants, the Brignole-Sale family. One of these, Gio Francesco II, who lived in the first half of the 18th century, took a particular interest in the care of the property. As part of a plan to rationalise various aspects of its layout, he engaged Matteo Vinzoni, a notable enginer and cartographer of the Republic of Genoa, to regulate the estate's waterways in a more complex and innovative manner than before. An authority on legal matters and questions of boundaries, Vinzoni carried out a survey of the modifications implemented by other engineers over the previous century. He evaluated the efficacy of their work with regard to the flow of the local waterways and worked out a new plan involving different techniques from those previously used in the area.

Mauro Agnoletti, *Exploitation technics of high trunk woods from Italian Unity to second postwar period.*

Despite the important role played in timber production, forest utilisation techniques where not much studied from a scientific point of view. The quality of our forest, the morphology of our wooded territories, the features of forest properties represented difficult problems for the development of modern forest utilisation techniques and an effective forest policy. These difficult conditions contributed to raise the costs of timber harvesting. Since the end of the last century our production was no more competitive with imported timber. The author discuss the role of forest utilisation techniques in the teaching of forestry in Italy since 1869. The technical evolution of harvesting and transportation techniques used in north eastern Italy from the 19th century are also described.

Francesco L. Galassi, *Technical innovations and sharecropping at the end of the 19th century: critics to a model.*

Conventional wisdom argues that share tenancy delayed the introduction of new technology in the agriculture of central Italy because the contract meant that landowners carrying out an investment would be unable to internalize its full benefits, having to share them at half with tenants. Inadequate investment kept productivity low and the area suffered from technical backwardness and poverty. The paper disproved this interpretation by demonstrating that landlords were able to recover the cost of capital investment from tenants. Delayed

agricultural mechanization in central Italy is thus explained as a result of relative factor costs, rather than imaginary institutional constraints: with cheap labour and costly capital, no reason to mechanize existed.

Andrea Leonardi, *Organisational and technological aspects of agriculture in German and Italian area of Tirol during the 19th century.*

The 19th century turned out to be particularly important for the activation of a group of innovative practices either in the organisational structure or in the technological system, also in a context as that of the Tirol agriculture which is basically mountainous. Several "agencies", both public and private-general, worked to speed up and innovate agriculture both in German and Italian areas of this region, leading to a sharing of knowledge, that came out to be positive for the lands of the whole Tirol. Monitoring the innovative efforts introduced in the mountainous agriculture, the essay emphasizes the analysis of one of the most significant sector of the regional agriculture: the viticultural-oenological sector, that during the 19th century was subject to important changes. Infact even if the viticulture had been hurt by a series of heavy diseases, due to very serious illnesses, it succeeded in finding out an adequate reaction thanks to the technological and organisational efforts carried out by "agencies" responsible of agricultural promotion and was able to start its own radical transformation.

Rosa Vaccaro, *Drainage and technology in the Italian economic policy (1860-1933). Hard formulation of a land regulation.*

The formulation of a measure which allowed to co-ordinate the public and private activity in order to solve hydraulic problems connected to the Italian territory, has been particularly complex. Major obstacles are due to structural difficulties and to strong social constraints that innovation had to face in some areas of the country. The liberal feature of the Baccarini Law, very soon showed to be ineffective and too limited in its purposes. Then, it was necessary to carry out a long and hard work to define a set of laws that allow to co-ordinate interventions in large integrated areas, from mountains to plains, including disposals enough stringent to enforce the land ownership to modify some methods of land exploitation.

Carlo Marco Belfanti, *Hosiery: fashion and innovation at the origins of the hosiery industry (16th-17th centuries).*

The studies relative to the history of textile industry in early modern Italy do not devote much attention to a manufacture, that of hosiery, which is held to be "minor". It is without doubt an industrial activity that, at least originally, did not take on an importance comparable to that of woollen cloth or silken fabric. However the increasing success with the consumer of silk stockings "in the English style", that is, made on the knitting frame invented at the end of the

16th century by the Englishman William Lee, makes hosiery a sector which cannot be ignored in textile manufacturing of the 16th and 17th centuries. The production technology of the "stockings in the English style" spread throughout Italy during the second half of the 17th century, at the height of the so-called "17th century crisis" and it is probable that negative judgement of the difficult situation of the Italian economy in that period has stopped us from appreciating the positive growth of hosiery manufacture. The article aims at contributing to filling in this gap by presenting the salient features of research in progress on the origins of knitted manufacture in modern Italy: starting from its 16th century beginnings with the production of hand-knitted items of clothing in wool and paying particular attention to the example of Mantua, and then proceeding to an examination of the evolution of the manufacture of goods knitted in silk in the cities of Milan, Turin, Genoa, Venice and Padua.

Alberto Guenzi, *Hydraulic energy and economic organisation of town. Bologna during the old regime.*

In the modern age Bologna was one of the most developed industrial centre in Europe, specialised in silk industry. In this town, 400 water wheels were operative; these wheels supplied more than 100 factories; the silk sector gave work to about 20.000 employees: men, women and children as well. The origin of this experience came out from the artificial hydraulic system projected and implemented at the end of the 20th century. The research highlights the relationship between the hydraulic system and the productive system through the analysis of the innovative process; in particular, it is important to pay attention to the movement of innovation from the urbanistic sector (or better from the territorial planning activity) to the productive sector.

Elisabetta Merlo, *Tanning process: two examples of innovation without development.*

During the 18th century, when chemistry was not yet a science, the tan was an empirical process. The three methods known at that time differed from each other for the origin of the raw material (vegetal, animal or mineral), but all proceeded by repeating few elementary operations. This contribute, by analizing and comparing two events that occurred in Milan - the semplification of the tanning process achieved eliminating the "intinnamento" (1697) and the attempt to introduce the chamoising (1770s) - arises some questions about the qualifications that a change in technical practises must have to be considered an innovation.

Roberta Morelli, *Evolution or revolution? Technical and organisational changes in Tuscany iron industry between the 16th and the 17th century.*

The paper presents a regional case of the introduction of innovation into iron

founding. Thanks to the temporary migration of technicians from the valleys of Bergamo and Brescia the so-called indirect process was first used in Tuscany in the mid-sixteenth century, after having been experienced in other European countries. There are three aspects to the innovation: the process, now divided in two separate phases, the new product, cast iron, and the new instrument, the hitherto high furnace. From this side it seems a "revolutionary" innovation. But applying the indirect process in Tuscany meant also the recoverting of the structures and the men of the previous method - the direct process - now absorbed in second phase of the production cycle. This remarkable "evolution" meant the proletarization of free craftmen noticeable in sources such as sale contracts, which also provide a new definition of human "hability" related to saving energy in production.

Franco Amatori, *From technology to organisation: a difficult passage.*

Technological evolution is the result of a social process which, once it materializes within a given set of technologies, becomes exogeneous to the same social actors from which it was born. These actors (in particular those in the most important institution of contemporary economy, the business enterprise) need to be aware of the constraints set out by technology. As a consequence, they must create organizations which can transform technological opportunities into economic advantages. This implies that within a given technological scenario, entrepreneurs, managers, and even workers must not fear that their actions can be hindered by social constraints. It is not easy for a ruling class to reach such a goal because it implies an ability to redistribute power which can clash with traditional authorities and consolidated hierarchies. An eventual failure can seriously weaken an entire economy. This short essay, complete with examples, tries to shed light on the difficult confrontation.

Carlo Bardini, *Production of capital goods and technology transfer: steam boilers in Italy according to the survey of 1890.*

The paper focuses on the role of tacit and cumulative capabilities during the 19th century adoption of steam power in Italy. It argues that they were crucial especially for the steam-generating phase of the process. Building on the work of N. Rosenberg, we looked at one of the most important factors leading to their creation, i.e., the existence of a local production of the corresponding capital goods (steam boilers). The paper provides a description of the 19th century evolution of steam boiler technology, and it then draws on an extremely detailed, and so far relatively under-utilized, data source concerning Italian boilers (the survey of 1890). In quantitative terms, one half of the domestic market resulted to be covered by local production. The share of imports was however made up with the most advanced and technically sophisticated boilers (water-tube and non stationary boilers). Our conclusion is that Italy missed this major source of tacit and cumulative capabilities necessary for the adoption and the mastering of steam power technology.

Elisabetta Tonizzi, *Innovation and modernisation in the port of Genoa from the Unity to the Great war.*

In the period within the last quarter of the 19th and the beginning of the 20th century, important works have been implemented in order to enlarge and modernise the port area of Genoa, first domestic place of call in terms of size and traffic volume. Some important innovations are set up and applied for the first time in the country. The pier named Galliera is realised placing blocks upon the base casting according to regular rows. At the beginning of our century, the barrier set up to defend the new dock called Lanterna is implemented following a new kind of process, named "vertical wall". The application of new technology concerns also the dry docks, the storage buildings and the lifting gear. At the end of the eighties the port was equipped with two new dry docks, built using compressed air tanks. In 1901 the first dock warehouse for grains was made up by reinforced concrete, while regarding the lifting gears, it has to be mentioned the system of cranes moved by water strength, implemented since 1890, and the electric elevator, operative from 1908 and devoted to the coal management. Finally, it is possible to define the port of Genoa as a large lab of formulation and experimentation of the most advanced technologies.

Giuseppe De Gennaro, *A model of incipient growth: the "manufacturing" industry in the province of Bari (1860-1880).*

The article offers a broad view of the economic situation of an important area of southern Italy at the onset of industrialization. The first part proposes explanations on the archivial and statistical sources that made the study possible. These sources owe their existence to ministerial directives circulated between 1857 and 1868 to Italian mayors, instructing them to report on "industrial" activities. The second part deals with the main characteristics of manufacturing at Bari. After duly noting that it would be misleading to focus attention on "factories" alone, the author stresses that the great majority of the plants are associated with the processing of products of the primary sector. Within this picture it is notes the expansion of the use of boilers for steam mills: from 3 in 1864 to 86 in 1878. Although this was a significant novelty, it does not seem to have affected the essential structure of the Bari economy, which remained firmly based on small family-run businesses. However, this innovation marked the start of a deplorable series of industrial accidents linked to the use of boilers.

Renato Giannetti, *Representations of technological innovation in historical perspective.*

The article reviews the main "representations" that historians of technology give of technological change. It distinguishes three main research traditions referring to "technological paradigm", "social construction", and a purely historical one. We find the roots of this changing traditions in the history of

science and in the epistemological controversies on the nature of science and technology. According to this partition the paper ascribes the different historical contributions to each of them. In the first group, "the technological paradigm", we review mainly Rosenberg's and Mokyr's contributions. The second group is more differentiated. It includes the socio-technical tradition of Thomas Hughes, who emphasizes the system effect of innovation, and the micro analysis by Walter Vincenti who shows how innovation can be described essentially as a problem solving activity of historical agents. A second group of historians refer more closely to a social view of innovation and technical change. Bruno Latour or Trevor Binch, f.e., emphasize the multidimensional character of technological change and the different actors that intervene to define the artifact. Finally the article shortly reviews the historical approach which, in essence, claims the priority of the historian in the selection of the right tools and criticizes the abuse of sociological categories in the historical work.

Andrea Giuntini, *Innovation technology within the gas industry from the electric light introduction to the first world war (1883-1914). Historiographical balance and some hypothesis of research.*

Primarily, the essay considers the period in which the gas industry has been replaced by the electric industry in the lighting sector, during the first years of the eighties in the last century. But in the gas sector, at least up to the twenties, a series of very important innovation processes occur. Technological innovations led to significant changes and to a different allocation in the energetic resources, so much that it is correct to state that only few industries have been subject, in the same period, to so many changes as gas industry was. Gas supporters infact replied to the attacks of the electric innovations, trying to emulate products and to adjust their own structures to the new scenario, offering their own availability to cover the area that the electric sector was filling up. A section of the essay deals with an historiographical weigh of arguments for and against the sector, that only recently has started to keep the attention of the historians.

Michele Lungonelli, *From tinplate to rolled coil coating sheets."La Magona d'Italia" facing technological innovation (1892-1973).*

The main subject of the essay is technology innovation in one of the most significant Italian iron company: La Magona d'Italia spa. The period considered lasts more or less eighty years, from the start-up (1891) to the middle of the seventies. The real strength of the firm comes out from the second phase of the iron processing: tinplate and galvanized sheets. Starting from the fifties, the firm deserted the direct steel production to develop exclusively the cold rolling process of precoated steel products. The arrival point of this evolution, at the beginning of the seventies, has been the launch in the Italian market of new products obtained from a coil coating process, that had as direct consequence even an important change in the internal organisational structure.

Michèle Merger, *Innovation in favour of improvement in the Italian railways. Technical and trade aspects (1860-1905).*

The earliest railways shout real technological defiances and it was the technical progress itself to offer a solution to the discrepancies rising from the new way of travelling. The Italian engineers have introduced innovations concerning the equipment of lines (steel rails from 1864-65 on), the locking mechanism of the trains (Westinghouse and Smith Hardy typologies of brakes introduced in the eighties), and even the train movement (implementation of the hydrodynamic system by Bianchi and Servettaz from 1886, applied to the throwing points and to the block system in the nineties). From a tariff perspective, it was adopted the principle of the "ad valorem" system, whose theoretical base was founded on the engineer Jules Dupuit's theory. Classification of the general tariff, according to the nature and the value of goods, and the introduction of differentiated tariffs, particular or special, had the purpose to attract and create traffic. This policy led to numerous conflicts between customer associations and Government, which supported the tariff uniformity criterium, trying to defend little producers and senders. Agreements defined in the 1885 represented a compromise between public and private interests, but led to new conflicts lasted until the formulation of the Railway nationalization Law in 1905.

Enrico Stumpo, *Hercules Gallic or Promethium Italian. Innovation and technology in the Italian economy from the Italian Wars to the second world war.*

The essay examines the long term evolution in the less known manufacturing sectors in the Italian economy. The author emphasizes the technological leadership of Italy, probably the most developed country in Europe during the modern age. He underlines its continuity also during the contemporary age. First of all, the passage analyses some productive sectors that have been able to improve and develop themselves (carts and carriages, glass, pottery, instruments, publishing and printing), even if based upon a traditional technology. Second, some innovations, originals or inherited, are considered since these innovations allowed the war industry, porcelain, cement, electronic devices and bursting machinery, motorcycles and radios to be successful. Finally, the case of Italian military navy is an example of the innovative interaction, in the long run, between army and civil society.

Michelangelo Vasta, *Technical progress indicators: patent employment in the analysis of Italian take off.*

This article examines technical progress in the period of the Italian take off through the use of patent statistics, focusing on the electrical and the chemical sectors. The value of patents as an indicator of innovative activity is considered, and the problems that their use gives rise to are dealt with. The Italian performance in the two science based sectors is then examined, and issues such as the

Italian dependence on foreign firms, and the regional distribution of innovative activity in the country, are looked at. The most important finding that the patent data point to is a clearly different pattern of development of the two sectors. The electrical sector managed, despite its initial state of backwardness, to become one of the most dynamic sectors of the Italian industry. The chemical sector, by contrast, did not succeed in liberating itself from the strong dependence on foreign firms, and at the eve of the first world war Italian chemical firms were altogether overwhelmed by Germany's predominance in the sector. Unlike the "success story" of the electrical sector, the chemical one was thus characterised by a "delay within the delay".

Marco Cattini, *Credit and finance in Italy: innovations and lasting.*

After having shortly discussed on the utility of the innovation concept and on limits related to its utilisation in a context of institutions and financial and crediting practice, the author analyses the principal characteristics of the Italian credit activities from the 15th to the middle of 20th century, showing the profile of an organisational evolution having high standard of development from the 15th and the 16th one. After that, in the 17th and 18th centuries, credit and finance showed a quantitative decreasing trend and a steady organisational situation. On the contrary, the 19th century was the lab of institutional innovation and credit activity enlargement, on local basis for the main part, according to public, co-operative and company institutional forms that led to improvements and widening, even within a framework of general economic backwardness.

Stefano Baia Curioni, *Telegraph and development of an integrated system of the stock market in Italy (1888-1905).*

The current work is focused on the evaluation of the impact that the telegraph diffusion had on the processes of the stock exchange price quotation in different Italian markets, at the beginning of the crucial phase of stock market development occurred in the 20th century. Referring to a similar study undertaken by Ken Garbade and William Silber in the United States, the target of the study is to empirically evaluate if and when the telegraph licences led to a market integration process and to the implementation of a unique national market. This integration, attested in the study, is the premise to the renewal of regulation debates which will result in the regulation of 1913.

Giuseppe Conti, *Financial innovations and corporate governance: finance and corporate capital in Italy (1870-1939).*

The financial development of the industrial economy in Italy began with the formation of limited companies and the growth of mixed banks around the end of the 19th century. By 1929 the nominal share capital in industry had reached European standards, but without a large capital market. This was due to the

emergence of a hybrid financial and regulatory model which joined the German style mixed bank and French style company law. Before 1907, the status of the limited company allowed enterprises to borrow, and the families and majorities to preserve control. In this situation there was a fundamental incoherence between company regulation and enterprise financing based after the turn of the century on the mixed banks. The code of 1882 did not have mandatory requirements favouring creditors and minority shareholders. Thus the share market was becoming a "market for corporate control" instead of a market for permanent capital for industry. The mixed banks lent to large companies, often taking risky equity participations, in order to intervene in the boards of directors' decisions. This model of bank financing stumbled after the crisis of 1907, and then fell under the effects of profit inflation during the post-war period and the deflationary policies in the twenties. The old banking order was not resumed. Some large companies gained near financial autonomy and established new business connections. Take-overs, mergers and control defence occurred moreover without new company law, but with a wildcat set-up of holding companies controlled by industrial groups or bankers. Before the crisis of 1929 the large mixed banks had huge industrial equity participations. The resistance to reforming institutional and legal regulation only worsened the situation and, starting in the thirties, led to the need to reform monetary policy and the credit system as well as the economic constitution of Italian State.

Tommaso Fanfani, *Insurance in Italy between the 19th and the 20th century: "life insurance" from a bet to an innovative product.*

Italian peninsula reaches with a certain delay the achievement of the life insurance sector. The main problem concerns the hard diffusion of the actuary science. The companies which operate in the life insurance sector, perform in an interesting way just only in the last decades of 19th century, and once again penalised by the shortage of the domestic capital. Life insurance policies increase in the last part of the nineteenth and in the first years of the 20th century. In a short time they become a business for those who see in these contracts an important instrument of capital collection in favour of public finance and a mean to increase mutual aid and social security within the rising industrial society of Italy. Debate among those who want to maintain private sector because they trust the free market, and those who ask for an active and entrepreneurial State thanks to monopoly, involve important actors of the theoretical and practical finance and economy: Einaudi, Pantaleoni, Beneduce, Stringher, Bodio and others. The supporters of the State role in this important sector prevail, and in 1912 the life insurance branch is nationalized and assigned to the "Istituto nazionale delle assicurazioni", that collects the portfolios belonging to previous private companies.

Anna Maria Galli, *Cariplo 1850-1895: new operative instruments in the investment sector.*

Cassa di risparmio delle provincie lombarde demonstrated in the investment

transactions two main worries and ambitions, that set some constraints on the operative instrument choice. First of all the effort carried out to defend deposits introduced in the Lombard minds a reliance feeling, fundamental in a recession phase, which allowed CARIPLO to acquire a favourable position of safety in an economic framework made up by banking failures. Second, besides the permanent effort managed to maintain special relationship with the Treasury, the interest towards important but safe business (as the financing of railway constructions and of public works in general) and finally the propensity towards high finance and important banks, it is possible to perceive a balanced and careful innovation capacity: which means the capacity to respond to expectations and requirements of the city area of Milan, that was becoming the focal point of the Italian economic life. In this framework the decision of starting trade discount and rediscount in favour of popular banks, land credit, silk business financing through the institution of the silk storehouse, and contango transactions have to be set.

Salvatore La Francesca, *The banking reform of 1926 and the banknote issuing unification, with particular attention to the Banco di Sicilia.*

The most important elements of the legislation measures undertaken in 1926-27, concerning either the adjustment of the monetary system or banking regulations, are shortly described. Analysing these measures, the linkages and the increasing importance of the part played by Banca d'Italia that undertakes all functions typical of a central bank, have to be underlined. In this dynamic scenario made up by significant changes which involve southern banks, problems related to the Banco di Sicilia are described especially because of the new role that the bank assumes in the ordinary credit business, whose co-ordinate functions concern the short credit and special administrations of credit in favour of agriculture, land and mining industry. This specialisation had an anticipatory feature with respect to the Banking Law of 1936.

Fausto Piola Caselli, *Innovation and public finance. The Curch State in the 17th century.*

During the slow consolidation process of the Church State, the first steps were mostly on the military and political sides, to guarantee the full control of the central government over the local towns. Later on, from the last two decades of the 16th century, the State strenghtening was rather supported by the public finances system, which in its turn was based on the relationship between the centre and the periphery, on the fiscal revenue and on the public debt. After the war of Castro and the final territorial settlement of the State, the task of dealing with the general economic crisis was committed to public finances, which were at that time conceived in a fair new way. Particularly, a relevant modernity was shown in the new rules concerning municipal balance-sheets, in the general fiscal policy and in the public debt, which was always issued with the greatest respect of the real needs and resources of the State.

Carlo M. Travaglini, *Origins of deposit collection of Monte di pietà in Rome and the first issuing of coupons (16th-17th centuries).*

Through an analysis of the evolution in the statute rules and of the resolution by the group responsible for the management of the Monte di pietà, the essay outlines the increasing statement of the deposit collection activity beside and in favour of the institutional task of credit with respect to the pawn. The management of the Banco is monitored either according to the improvement in the accounting reporting practice, in the sharing of responsibilities among employees and in the stating of checking transactions, or according to the decisions taken on the management of the collection activity. At the beginning of the 17th century, it seems to be consolidated, within a framework of high development of collection, an operative model which finds in selling and buying Government stock the balancing element of the treasury fund management.

Giovanni Zalin, *Istituto federale di credito and its role in the rising of the venetian regions during the first postwar period.*

The purpose of the article is to point out the role played by Istituto federale di credito (created in 1919 by a group of local and national banks) in the reorganization of the civil and productive structures of three venetian regions, which had been greatly upset in consequence of the battles between the opposed armies. The author describes the complex history of the abovementioned Istituto up to its transformation in Istituto federale delle casse di risparmio delle Venezie.

Achille Agnati, *Technology and development in the history of economic thought.*

Starting from the labs and overlooking the factories of the industrial revolution in the end of the 18th century - beginning of the 19th century, the essay examines the economic development as the result of some principal macro positive effects of technology on the economic and non-economic framework. Basing upon the dynamic positive synergetic relationships between technology and development, the passage suggests an historical excursus over the main theories about economic development (as social welfare) due to technology: pre-classic, classics: Bentham, Ricardo; Marx and orthodox marxians; neoclassics and equilibrists: Pareto, Barone, Schumpeter; Lenin and heterodox marxists: Novozhilov. Finally, the essay describes how, starting from the general economic history and critics on economic theories developed on technology and development advanced until now, it is possible to deduce some lessons on conditions according to which real economic evolution occurs in three important moments of the dynamic economic scenario.

Pierluigi Nuti, *Physical and political economics: command over energy in the classical theory of production.*

In order to go beyond physiocracy Smith developed a double theory of labour

value; Ricardo reduced it to manpower content. Then physics did not provide unequivocal definitions; thus Marxian extra-value coincided with surplus-labour. Say hinted at ananthropic work of land and machines, but resolved value into subjective utility. Mill emphasized command over nature and opposed physical production to social distribution. Nowadays we can take account of Say's objections, while retaining classical objectivism. In the *Wealth of Nations* we can spot the command over animal, water, wind powers. Contemporary to *On the Principles* was steam energy, and coexistent with *Das Kapital* were electric and oil powers. A historiographic problem turns to be theoretical: a physical surplus is conceivable which is not a material one. Output is command over added energy. So energy commanded is useful to gauge wealth production and distribution. Following Sraffa, we can found our issue on the replacement of human labour with mechanical work. This will not lead to any "energy theory of value", rather, quantitative economics will get a "real" measurement to be contrasted with subjective prices.

Daniela Parisi, *Technology and pattern of the system: industrial cartels in the economic thought at the end of the 19th century.*

At the beginning of the 20th century, when development acquires the feature of a continuing process and new socio-economic phenomena, linked to industrialisation, are verified, also economists start in considering within their analysis some aspects generally left aside until that moment. The implementation of industrial cartels is one of the aspects that also Italian theorists of the market mechanisms identified. They underline that the exigency of regulate the supply and increase the firm size in order to obtain economy of scale, leads to changes in the market structure and significant effects on the development trend of the system.

Nicola La Marca, *Interventions managed in the last part of the 18th century in order to sustain the technological development of the papal productive system.*

The study starts with a short description of the ideologies belonging to some of the most active characters that in the last part of the 18th century in the papal State gave a faster and more organic rhythm, not only to the Enlightenment reforms but also to the public intervention decided to support the domestic industrial development. In addition, it is described the whole set of different measures adopted, either those of mercantilist nature or those more modern as lending money without any security or cheap loans. Then, the author focuses on the strategies adopted in the training of experts and the strong promotional activity in favour of a widespreading of the new technologies all over the area and of the public financial decisions undertaken to support the new sources of expense.

Rolf Petri, *Innovation technology and "autarchy". Evaluation problems of long term effects.*

The essay faces the problem connected to the role of innovation technology in making more difficult the evaluation of effects coming from a phase of economic policies on changes of long period. The example considered is that of autarchy during the period 1935-43. Some critics, based upon the comparative costs theory, argue that the inefficient allocation of resources, supplied in that period, would lead to long term damages on the development of Italian industrial system. According to the author, on the contrary, a sentence based exclusively on allocation efficiency in the different moment of the period considered, or, in general, on single macro-economic fluctuations occurred in the same period of time, can't be sufficient, because every technological innovation generates in any case a "non-optimal" allocation. On the other hand, the diffusion of progressive effects coming from innovations, hardly obtained, during the autarchy, has been realised through too complex linkages. They make difficult to determine one way rapport of causality between micro-events of innovation and macro-changes in the long term. In consequence of that, neither the explication models nor the reconstruction of events can provide defined answers on the historical role of autarchy in the industrial framework.

Pia Toscano, *Public support to the industrial sector in the Roman area of the papal State during the first half of the 19th century.*

At the end of 18th century the policy of public financing decided by the papal Governement in favour of Roman industry determined, above all in Rome, a productive apparatus which allowed the realization of a program of industrial growth. On this basis, in the course of the 19th century up to the Unity of Italy the popes tried to find the means to favour the growth of production in Rome and in the neighbouring territory. These means were found in public capital and in the ability of mediation of governors between conservative forces and innovative impulses. In this long process, the leading role was played by the Camere di commercio, Congregazioni economiche, and Accademia dei Lincei, three organisms which had to verify the real state of production throughout this territory.

Vera Zamagni, *Technical education and industrial culture in post-unification Italy: the local dimension.*

The essay sketches the development of technical and vocational education at the secondary level in Italy from unification to the present, with particular attention to the trend of students enrolled, in absolute and relative terms. It is shows that such development was very slow in spite of the good legislation introduced by Casati in 1859; it was held back by Gentile's intervention in 1923, restaured to its original level by Belluzzo, but the boom came only after the second world war. At the regional level, the presence of technical schools was more widespread in the North of the country, because there was greater propensity by the

part of the local élites and municipalities to set up schools that would train workers and artisans for the newly born manufacturing enterprises. This North-South difference has remained in existence to the present day.

Alessandra Zanzi Sulli, *Origins and evolution of a forest technical culture of the unitary State.*

After a short overview of the status of forest and of their administration at the beginning of the unitary State history, the essay analyses the role played by Di Bérenger and the Istituto forestale of Vallombrosa in gathering forest knowledge, that for some years were isolated from the political and technical culture present in the Italian most powerful social classes. The Forest Law, ratified in 1877, in order to rationalise the management of the national forest estate and to improve and increase the area covered by trees, reveals the weakness of the Italian culture in this sector, its implementation leads to a further reduction of the forest wealth. A critical thought, turned out to underline the biological and socio-economic features of Italian forests and some technical principles to elaborate a specific Italian forestry, rises at the end of the 19th century, by experts and owners who state their point of view in "L'eco dei campi e dei boschi", edited by Lunardoni. The socio-economic analysis made by Serpieri on the resources of the mountainous areas and on compulsory integration with the rest of the national territory and the technical-scientific formulation by Pavari, set the basis of the modern forestry at the beginning of the 20th century.