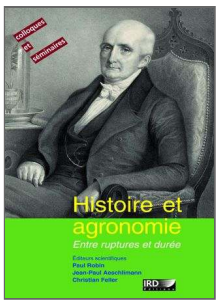

Paul Robin, Jean-Paul Aeschlimann et Christian Feller (dir.)

Histoire et agronomie
Entre ruptures et durée

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Abstracts

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Abstracts

Geneviève Gavignaud-Fontaine: 'The contribution of the historians'

The dialogue between historians and agronomists keeps developing. While agronomists and economists have generally seemed to understand each other, in recent times many rural historians have been emphasizing the very long-term for their observations on the social, and hence human, consequences of the economic development.

Confronted with the time in terms both of the civilisations and of the thinking on which they are based (that is made of continuity in between crises and ruptures), some historians are using the notion of "sustainable development" as a key for efficient multi-disciplinarity and as a meeting place for agronomists, historians, economists, and others scientists.

Keywords: Long-term — Multidisciplinarity — Sustainable development.

Paul Robin: 'Agronomists and history : Questions arising from a practical example'

Whereas both the citizen and the consumer question the processes of the agricultural production, the agronomist is confronted with the meaning of his commitments and of his responsibilities. The history of his discipline shows that confrontations and discussions on the strength of his commitments have been permanent issues. But how can he face history?

Organic agriculture that does not use any chemical input is an example of to-day rooted in an old debate which reveals how much the point of view of the historians is needed. Howard (1940)' satire was a reaction against the agricultural chemistry launched by Liebig in 1840. Quite apart from the epistemological ruptures that were linked to the new sciences, the debate over the long duration developed around topics that are still up to date, i.e. fertilization and humus, innovation and tradition, science and practice. This historical example shows that history may even be used as an intrument to support an intellectual belief of truth. It is also an invitation to increase our understanding based on the ecosystemic and

agroecological approaches as revisited by historians. It finally reveals that founding fathers, e.g. de Saussure for plant physiology, or Thaer for agronomy may be hiding behind mythical scientists and that dates have been forgotten, like 1804 in favour of more popular anniversaries. To face these historical aspects and reconstruct a collective memory with an open, critical mind, historians and agronomists have to instaure a dialogue and common meeting places have to be created. An anniversary could well represent such an opportunity.

Keywords: Agronomy — History — Agricultural chemistry — Organic agriculture — Humus.

Gilles Denis: 'Agronomy in a broad sense: history of a discipline, of its definitions and of the words used to identify it'

Agronomy as a broad scientific field including all the agricultural sciences has a different identity depending on the country involved. In some countries, France in particular, the field has a relatively strong institutional and sociocultural autonomy. In other countries, as in the United States, this autonomy is weak due to the fact that the agricultural sciences are institutionally much more clearly separated, very often in the framework of the university. As a consequence, it is mainly in a country like France that writing a history of agronomy makes sense. Elsewhere one would rather speak about the history of agricultural sciences. As for the definition of the terms, disciplines and functions allow to precisely compare the emergence and evolution of the word "agronomy" accross countries and times. The field first appeared as such between the mid-18th (one generation before in Scotland) and the mid-19th centuries, i.e. in between a time (1740-1760) when a first community started to use the sciences for improving agriculture and a time (1850-1880) when the discipline of agronomy and the fonctions of the agronomist became institutionalized. In the 1960-70s, another rupture occurred due to the changing socioeconomic and technoscientific context of overproduction, worldwide markets, molecular biology and biotechnologies, environmental, food quality concerns, etc. After this rupture, questions concerning the nature and status of both agronomy and agricultural

sciences were raised again. And again we have to face the same contrasting tendencies: chemistry (or cell) reduction vs. synthetic, global approach; separated disciplines vs. a unified, proper field of study, i.e. agronomy in a broad sense.

Keywords: Agricultural sciences history — History of agricultural sciences disciplines — History of agricultural sciences institutions.

Simone Mazauric: 'From the baroque to the classical age: construction of a new scientific rationality'

According to a number of philosophers of the age of Enlightenment, the birth of modern science called for the emergence of a new form of rationality henceforth thought to summarize scientific rationality, and for the simultaneous forsaking and denial mainly via criticism of believes that supported them, of rationality forms held as infantile, popular, "vulgar", and at any rate strictly non-scientific.

Though abandoned during the age of Enlightenment, these modes of rationality are attempting a return to the erudite scene. This emergence process will be examined with respect to the historiographical category of "scientific revolution" and a much more cautious interpretation than that derived from the rationalistic optimism of the age of Enlightenment will be proposed.

Keywords: Modern science — Rationality — Enlightenment — Scientific revolution.

Philippe Jouve: 'Periods and breaks in the evolution of agronomic knowledge and teaching'

The evolution in the various agronomic fields did not follow a regular and continuous stream. Some noteworthy breaks have marked the major steps in the evolution of our knowledge.

The very first period goes from the earliest antiquity to the end of the 18th century and is mainly characterized by the acquisition of empirically based knowledge. A second period, which could be called analytical, has been marked by the development of sectorial knowledge on plant production and by the way the scientific research has been conducted from the empirically observed variety to the variation. But all along that period, agricultural science looked more like

an archipelago of knowledge than a science of its own. The period which led to the uprising of the modern crop science has undergone a more drastic rupture, as it inversed the relationship between reality and theory, asserting the primacy of the idea on the fact.

Recently, important changes have occurred in the objects, the methods, and the aims of the agricultural science. First of all, the transition from the study of the techniques to that of the cultural practices has led the agronomists to involve the stakeholder in the analysis and the management of all the production processes. Furthermore, the increasing awareness of the environmental reservations has led the agricultural scientists to try and reconcile the production with the protection and the management of our natural resources, and to achieve this aim, to widen their study fields.

Keywords: Agronomic knowledge — Epistemology — Evolution — Teaching agronomy.

Georges Pédro: 'Soil, humus and plant nutrition. From agricultural chemistry to agrogeochemistry (18th-20th centuries)'

This communication deals with the nutrition of cultivated plants. It shows how scientific investigations on the topic gradually developed during the 18th and 19th centuries to encompass all aspects from plant to humus, from humus to earth, from earth to soil, from soil type to pedological cover and from pedological cover to the bioagrogeochemistry of the agrosystems. This course of events also led to the emergence of the many disciplines that are presently being associated with plant nutrition, i.e. chemistry, agricultural chemistry, agrogeochemistry, soil science, pedobiology and biogeochemistry.

The whole process demonstrates that finding solutions for any particular scientific problem in relation to either natural or man-influenced environments generally results from a very slow evolution involving many research scientists active in widely different disciplines.

Keywords: History — Plant nutrition — Pedology — Agrogeochemistry.

Hartmut Stützel: 'Experimental agronomic sciences. Memories from yesterday, hopes for tomorrow'

Agronomy as an experimental science began to develop about 200 years ago, in a time of rapid population increase in Europe. In the beginning, research was performed on the field, cropping systems and farm level. Over its development, agronomic science increasingly became specialized and reductionistic. This led to big successes in yield improvement but negative ecological impacts. What the world expects from agronomists is the intensification of production by increasing resource use efficiency. This requires the integration of knowledge over several system levels. It also means that agronomy has to be developed as a system science in which computer-based systems modelling becomes a central tool. Agronomy will remain an experimental science, but in the future many experiments will be carried out in the computer, thereby enlarging our theoretical understanding of crop production systems.

Keywords: Agronomy — Cropping system — Rational agriculture — Organic agriculture — System science — Agronomic modelling.

Marika Blondel-Mégrelis: 'Agro-ecological perspective of 19th century chemists'

We intend to show that two chemists, leaders of two opposite schools, must be considered as pioneers in the field of agro-ecology. This aspect of their work is poorly known, but needs attention. J.-B. Boussingault is famous for his lasting research on the nitrogenous nutrition of plants and animals, J. Liebig as the founder of rational agriculture, i.e. chemical agriculture. Both considered human activities with regard to their impact on the environment.

Agriculture is an entrepreneurial activity. How can we measure the action of human beings on natural resources?

Being chemists, both research workers were using methods of chemists. But the systems they work on are considerably larger in space and time, undoubtedly inspired by Humboldt's high and broad views.

Keywords: Agricultural chemistry — Agroecology — Boussingault — Liebig.

Guy Paillotin: 'Agriculture, society and rationality'

Clearly the birth of agriculture, its expansion and exceptional rise during the last fifty years are the fruits of scientific and technical changes. But this progress also occurred as a result of the social acceptance of these mutations.

Today, all the technical and social components of the progress are much more closely linked than ever before. This offers a new challenge for agronomy: how can we reconcile both approaches, the one that belongs to the so-called "hard" sciences, the other to the "soft" sciences.

Keywords: Agronomic evolution — Present development — Social acceptation — Production and consumerism.

Michel Cointat: 'Modernity and memory'

In its contemporary conception in terms of economic policy, agriculture dates only back to the end of the second world war. Some of the practical difficulties arising from its recent evolution may be usefully examined in the light of three important historical examples.

Hannibal will be the first example whose strategic decisions have recently been shown by in-depth landscape investigations to be perfectly correct. The beautiful oak forests thriving now on the damp soils of the Haute-Marne department - yet of poor quality because they grow far too rapidly - may serve as a second example. Finally, one had to wait for the scientists of the 16th century to discover and produce new fruit varieties with high sugar contents which allowed for alcoolic beverages to be made without added honey. As a consequence, agriculture always needs to be supported by history and without the latter there is no memory and hence no progress.

Keywords: Agronomy — History — Memory — Development.

Christian Feller: 'The need to get back to the source with regard to agricultural history. The example of plant mineral nutrition and the "genius" Palissy'

Most historical works on the theory of plant nutrition refer to the trilogy: Palissy and his "salt theory" (1580), Thaer and his "humus theory" (1809-1812), Liebig and his "mineral theory" (1840). The historians of agronomy and soil science

often describe Palissy as a genius and a forerunner in terms of mineral theory because he is supposed to have emphasized, almost three centuries before Liebig, the importance of the "salts" for the nutrition of plants, and the need for them to be returned to the soil. It seems, however, that the agronomist and historian Grandeau (1879), who rediscovered Palissy as a forerunner, assigned to the term of "salt" used by Palissy the modern sense of a mineral constituent. Re-reading the original – as did Grandeau – clearly shows that Palissy did not use the term of "salts" in that sense, but as designing an universal growth principle without any particular reference to either the mineral or the organic domain, a distinction that did not happen to be made at the end of the 16th century. The notion of salt as a general principle was common at the time, and lasted up to the end of the 17th century. At any rate, Palissy was otherwise an exceptional scientist, but he cannot be considered as a forerunner of the mineral theory of plant nutrition.

Keywords: History — Plant nutrition — Salt theory — Palissy — Liebig — Grandeau.

Pierre Cruiziat: 'Three historical steps in our understanding of the physics of sap ascent in trees. From Hales (1727) to Dixon (1914)'

Three of the main research workers involved in our understanding of the mechanisms allowing the ascent of sap in the tree are being considered, i.e. Hales, Duhamel du Monceau and Dixon. For each of them we summarize the scientific context, make a short presentation of his major contribution in that particular field and produce elements to measure his account based on our present knowledge. To conclude two points are being emphasized, i.e.: i) the same experiment may be interpreted differently according to conceptual frameworks that keep changing with the time, and ii) in this discipline it is highly difficult to fully appreciate the conceptual framework of a scientist according to articles published in scientific journals only; what is really wanted here is the approach of a historian of the sciences.

Keywords: Conceptions — Tree physiology — Water transport — Hales — Duhamel du Monceau — Dixon.

Henry Feyt: 'Developments and breaks in plant breeding'

Plant breeding began with domestication some 8-10.000 years ago, producing the species and traditional varieties that are at the basis of modern agriculture.

Breeding on pragmatic bases has been developed since the 18th century for vegetatively propagated crops and since the mid-19th century for autogamous species. Breeders, and producers of plantlets or seeds have had a hard time having their work and rights recognised.

With the re-discovery of Mendel's rules, plant breeding became an applied science using more and more sophisticated technologies, mainly implemented by public research. The recognition of the plant breeders' rights favoured the development of private companies which boosted the progress in agriculture, especially since 1945. The implementation of the Upov system in 1961 consolidated the role of private companies and led to new partnerships between the public and private sectors.

Recently, new biotechnologies and claims from developing countries raised up the issue of intellectual property rights on living material resulting in the new status of genetic resources as adopted at the Rio Conference, with a big question mark on customs and rules followed by breeders. However, the *sui generis* system adopted for the protection of plant varieties may be considered as a model with concrete, efficient and equitable answers to the current debate on genetic resources and life patenting.

Keywords: Plant breeding — History — Plant varieties — Plant breeder's rights.

Pascal Clouvel, Isabelle Michel-Dounias, Jean-Pascal Pichot, Michel Crétenet: 'Agronomy and the structure of the African cotton production. From the decolonization to the liberalization of the cotton industry'

After World War II, both the cropping of cotton and the subsequent processing were established in most western and central African countries. These companies gradually developed to be as important as the States themselves, integrating all the various segments of an agricultural industry on top of

additional functions such as the granting of financial facilities up to the rural development. Weakened since the beginning of the 90's by some policy changes of the World Bank and the shock wave of the liberalization, these organizations have evolved along different ways according to each particular country. Yet, all of them have moved from a unique, integrated organization towards a number of economic segments among which farmers associations are playing a primary role.

In terms of agricultural reseach, this transition has been accompanied by deep modifications in the demand as well as in the technical approaches. Today most scientific know how in this field has been developed by Northern research institutes, however, for use in their own national agriculture. As the terminology and the main concepts basically apply to a given social organization, they need to be revisited for application under the conditions of countries in the South. This is what the authors are trying to do based on an historical analysis of the main evolutions of the companies involved.

Keywords: Social organization — North-South relationships — Agronomic concepts.

Mark Overton: 'Agronomy and agricultural history in England'

This paper considers how agronomy can help our understanding of agricultural change in England from the middle ages to the 19th century. Two examples are given of decisive breaks or ruptures in the continuity of farming systems. The first is the alleged exhaustion of the soil in medieval England which has recently been studied through a study of the nutrient balance in a medieval village. The second is the so-called agricultural revolution. The application of some simple concepts from agronomy reinforces the idea that a 17th-century agricultural revolution is unlikely, and that the more significant breakthroughs were a phenomenon of the later 18th century.

Keywords: Agronomy — History — England.

Martin Frielinghaus, Claus Dalchow: 'Thaer 200 years at Möglin (Germany)'

In 1804 Albrecht Daniel Thaer (1752-1828) followed an invitation to establish his domicile and his activities in the Prussian kingdom. He purchased the manor of Möglin in the Eastern part of what is nowadays the Federal State of Brandenburg. At Möglin he was able to develop his concept of rational agriculture, managed both economically and sustainably, and based on crop rotation, soil improvement by marling, increased field forage, stable feeding, extension of grassland by man-made alluvial pastures, and sheep breeding, and management. He contributed actively to designing the Prussian agrarian reforms. Many components of the actual German soil bonitation are based on Thaer's ideas. In 1806, Thaer founded an agricultural school at Möglin, which became the Royal Prussian Academy of Agriculture, and lasted up to 1862. Many of Thaer's ideas are still relevant. In autumn 2004, the Promoter Association Albrecht Daniel Thaer marked the 200th anniversary of Thaer's purchase of Möglin by an international congress.

Keywords: Prussian agrarian reforms — Agricultural Academy — Rational agriculture — Manor of Möglin — Humus theory — Crop rotation — Sheep management — Soil bonitation.

Jean-Daniel Candaux: 'Nicolas-Théodore de Saussure and his archives. A documentary overview (Switzerland)'

Nicolas-Théodore de Saussure (1767-1845) is still wanting a biographer. In the Public and universitary library of Geneva, the archives of the de Saussure family preserve nevertheless a big bag of his manuscripts: working memoranda, reader's notes, travel diaries, correspondence, private papers and so on. The various drafts and copies of his "*Recherches chimiques sur la vegetation*" (1804), for instance, explain the laborious birth and way of this masterpiece. The inventory of the notes and diaries he kept during nearly 35 years of his life throw some helpful light on his intellectual relations and scientific achievements.

Keywords: Archives — Inventory — Nicolas-Théodore de Saussure — Geneva.

Patrick Bungener: 'Botany at the service of agriculture. The example of Geneva's scientists'

In France, some historians agreed that botanists of the 18th century were interested in their subject solely to gain perfect knowledge of the plant kingdom and without seeking to justify their works based on social and economic usefulness. Nevertheless, during this time, a debate occurred among botanists concerning the need for botany to take into account studies useful for the progress of human society and related to plant cultivation and propagation. In Geneva, scientists such as Charles Bonnet, Horace-Bénédict de Saussure or Jean Senebier were influenced in their work by the agronomist Henri-Louis Duhamel du Monceau; they actually justified their research in the field of "plant physics" because their resulting discoveries could be useful for the improvement of agricultural practice. Although it has a Baconian origin, the rhetoric of the recognition of the usefulness of scientific knowledge, particularly in botany, appears frequently in the writings of the naturalists during the age of Enlightenment, especially in those from Geneva.

Keywords: History — Agriculture — Botany — 18th century — Geneva.

Thomas Fouilleron: 'Court nobility, country nobility. The farming practices of the princes of Monaco, from the time of the Enlightenment to the beginning of the 19th century'

The mania for agriculture at the time of the Enlightenment, with the breakthroughs it created in the countryside, has not had the role with which people have sometimes credited it. For the three princes of Monaco who shared this mania it was more than a hobby. While being enlightened enthusiasts they also had a political and social mission: the patronage of the countryside.

In Normandy Honoré III (1720-1795) embraced two fashionable fads of the aristocracy at the time – horse breeding and a mania for everything English. The introduction of mulberry trees in Monaco, from the 1730's onwards, was a continuation of the efforts made by the French monarchy to develop within the regions of France a type of agricultural

activity that was lucrative; it was also a demonstration of the desire of the princes to make use of the resources of the principality in varied ways. The Duke of Valentinois, who was to be Prince Honoré IV (1758-1819), had a comparatively large number of books on farming, including English works, and this is further confirmation that at the end of the 18th century there was a certain fondness for the subject of land management. Honoré V (1778-1841), who was more practical than scientific, and who had retired to his estates in Lower Normandy at the time of the July monarchy, was opposed to the excesses of liberalism and wanted to revive the ties between the manor and the peasantry: his aim here was to make use of the production surpluses resulting from new crop rotation practices to provide work for, and feed the needy and the beggars.

Heralding the agrarian movement of the end of the 19th century, this commitment to a philanthropic method of farming is a testimony to the continuing paternalistic ideal of the country gentleman. While being more of a social, economic or political movement rather than a scientific one, it nevertheless opened up the way to some degree of progress.

Keywords: Nobility — Philanthropy — Monaco — Normandy — Enlightenment.

Jean-Pascal Simonin, François Vatin: 'Briaune's agronomic thought (1798-1865, France)'

Briaune was the first professor to teach agricultural economics at the "Institution royale agronomique de Grignon" from 1833 to 1838. His works are characterized by a refusal of the general agronomic theories and by a study of optimal practices adjusted to each particular situation. For example, one of his most important contributions was the rehabilitation of the permanent pasture system which used to be rejected by the agronomic theory of his time.

Keywords: Agricultural practices — Permanent pastures — Rural policy.

Fabien Knittel: 'Innovation and its dissemination in agriculture. The example of Mathieu de Dombasle (France)'

The French agricultural scientist Mathieu de Dombasle (1777-1843) became famous thanks to his developing a type of swing plough and new cropping practices. He actually invented nothing in particular, but was mainly able to make a better use of the principles of the new agriculture of the 18th century. Nevertheless he gained more credit for the large spreading of his ideas and for his swing plough and should rather be considered an innovator for the several means of diffusion he adopted.

Keywords: Mathieu de Dombasle — Innovation — History of agronomy — Lorraine — Tillage — Swing plough — Agricultural school.

Michèle Brunet: 'Landscapes, territories, and long duration. The archaeological evidence'

In addition to written sources, landscape archaeology, which emerged in the 70', provides a new range of evidence for the common and interrelated history of man and environment. At the example of Delos (Cyclads, Greece), a very famous place during classical antiquity but actually a very small island, it is possible to follow the history of an agrarian landscape for more than two thousand years, starting with its first modelling in the 5th century B.C. up to nowadays.

Keywords: Landscape archaeology — Subsistence agriculture — History of ancient economics — Terraces — Irrigated crops.

Catherine Chadefaud: 'Anthropization and landscape modifications in Ancient Egypt'

Studying landscape evolution drives historians to cross compare information from various domains i.e. architecture, hieroglyphic and hieratic sources, ancient craftworks and plant remains. The Nile valley, ancient Egyptian life space, has been domesticated and its land-use planned. Different points of view and cases, in terms of space and periods, are oriented according to anthropization and agronomic practices. Swamp's draining and enrichment pharao's volontarist policy can be observed at the example of the Fayum case study

(from 1800 B.C. to the Greek period). The Governors' orchards and gardens around Karnak, New Kingdom (i.e. around 1500 B.C.) are a second study case. The third one deals with landscape structuration, during the Greek Lagide period, through sacred trees plantation and forested clods building in the sanctuaries grounds all along the Nile valley. As a conclusion, we propose a global vision of the landscape modification from Kheops to the Greek period due to the Nile flood domestication, irrigation, and work organization in an antique civilization.

Keywords: Fayum — Irrigation — Legumes — Nile floodings — Orchards.

Mélica Ouennoughi: 'Maintaining palm tree cropping practices in oases'

In spite of the current upheavals occurring in the Saharan oases, the palm tree remains a strong symbol of Mediterranean civilization and is considered *in fine* as the basis of a sustainable agriculture. The presence of date palm in various parts of the world dates back to more or less recent introductions and answers purely agricultural production needs. In New Caledonia the date palm introduced through sowing by oases people deported in 1871 is of particular importance. Both history and agronomy show that the people from the oases kept a reserve of these fruits during their trips. By reconstituting in New Caledonia an environment remembering that of their origins the people from oases followed a need to survive.

Keywords: Palm tree — Date palm — Civilization — Phœniciculture — Oases — New Caledonia — Biodiversity.

Régis Ambroise: 'The landscape project in agriculture'

Looking back into the past brings forth how valued or protected landscapes are products of technical, political and cultural visions, especially when such visions have been strong enough to cross several historical periods. Landscapes are the expression of particular projects. Contemporary landscape scientists have described the production of a specific landscape culture among agronomists,

crop specialists, and farmers, linked to farming projects and land-use planning. This farming culture of landscape is in itself a reflection of the values of these historical periods. This article questions the possibilities of re-introducing the question of landscape within contemporary agricultural policies and visions.

Keywords: Landscape — History — Agricultural conception — 21th century.

Jean Pluvinage, Jean-Luc Mayaud: 'From rural agriculture of the 19th to the multifunctional agriculture of the 21th century'

This paper shows that the multifunctionality of agriculture, which nowadays appears as an agricultural policy issue, has a historical background. The latter stems in particular from the role that was assigned to the small family farm by the French Revolution. Its role consisted in contributing to the organization of the society and of its territory, quite apart from producing food. As before, its role remains the production of agricultural goods, but today it also includes the management of private and common resources in the framework of activities that keep interfering with those of the urban society.

Keywords: Agricultural industry — History — Production — Management — Social role.

Pascal Marty, Jacques Lepart, Georges Kunstler: 'Cultural landscapes caught in their dynamics. The example of the Grands Causses'

Landscape analysis nowadays moves around two trends: an ecological and a cultural standpoints. Both are confronted with the difficult question of the landscape dynamics. Starting from the idea that the gap between a reading purely based on their representations and another reading actually based on the natural systems does not allow for the natural and social processes involved to be understood, this contribution tries to characterize this gap in a context of strongly changing landscapes.

An attempt is first made to show how the Causses' landscape initially considered of no interest whatsoever at the beginning of the 20st century has become an element of the

national heritage. The way major publications have defined the characteristics of the landscapes and the societies of the Causses in emphasizing the aesthetics of both the open environments and of the life form of their inhabitants is being examined.

A second step tries to demonstrate that this landscape too often considered frozen in its traditional image is in reality highy dynamic. Diachronic maps are used to show how this landscape transformation occurs. The ecological mechanisms are presented, and in particular the positive interactions between woody species which allow the main colonizing plant species (pine trees and oaks) to successfully transform the open environments into closed forests.

Finally, it is explained why in its present way agriculture makes very little use of the open environments. As a consequence, the Causses' landscape as described in the frame of nowadays heritage does not appear to be as stable and in equilibrium with shepherding activities as the traditional imagery would have it. It is rather now in a transition stage between the very open, heavily cultivated landscape of the Ancient Regime and the predominantly forested landscape of the global agriculture.

Keywords: Landscape — Heritage — Ecology — Agriculture — Dynamics — Causses.

Étienne Landais, Fabien Boulier, Paul Robin: 'Agronomy and agricultural scientists. For which future?'

The French agronomy is undergoing deep modifications and has probably come to a turning point with regard to its future. Heir of a long tradition and strong of its international, Mediterranean and tropical dimensions, Montpellier's higher education and research center is being reorganized. The creation of an "Faculty of agronomics" is on the agenda for 2006. The remarkable accumulation of research units, many of which are interdisciplinary, constitutes an original scientific, and technical space focusing on agriculture, food, the agri-industries and the environment that benefits from a privileged academic and institutional context.

The agro-ecological project which units the stakeholders is based on the will to maintain a permanent dialogue between

the applied disciplines which are at the very heart of the project and the academic disciplines which are acquiring the new knowledge. Its future depends upon a successful transmission of the specific skills, and of the agronomic background they imply to the new generations. If the disciplinary dialogue is strong within the field of biology, it calls for much more adequate consideration of ecology and of the social sciences.

The center's ability to transmit knowledge clearly appears underdeveloped as compared with foreign universities. As a consequence, the higher education in agronomy ought to be much closer to the agronomic research, the teaching capacity of which is notoriously insufficient. Educating useful bearers of knowledge for the society and actors of a history to come, should probably be the first aim of a "responsible hope", the sole one likely to sustain the target of a more sustainable development.

Keywords: Education — Research — Agronomy — Engineering — Future.

Paul Robin, Jean-Paul Aeschlimann: 'An agriculture for tomorrow. Some elements of thinking'

Associating past and future with the discipline of agriculture poses both philosophical and methodological problems. The academic communities of the human as well as of the experimental sciences are necessarily involved in the new challenges that our societies are facing. To tackle these challenges, a systemic analysis first has to be to developed and applied. An ecological approach that focusses on the interactions between living organisms, and between ecosytems, and between natural and man-altered landscapes leads to changing attitude and to questioning the current epistemological models. This is clearly documented by the way Eugene Odum's thinking evolved over a 50 year period, even if it is only one of the possible approaches to the ecological science.

The ecological challenges nowadays also imply that our societies define their ethical criteria with regard to our scientific, social and political practices. This new ethical system will simultaneously represent a profound questionmark

concerning the responsibilities of the practitioners. In his *Imperative of Responsibility* Hans Jonas urges to regain through an "opening to the always stronger appeal which incites to humility", " the respect for what man is, and used to be, yet retreating with horror from what he could become". Acquiring an ecological conscience and formulating an ethics of the responsibility, however, first claim for the emergence of a clear consciousness, based on the long duration, as the history and the dissemination of Aldo Leopold's thinking amply demonstrates. All the practitioners involved in the rural and agronomic sciences, and in the agricultural world will have to cope with that situation. The historical perspective constitutes an essential element of that awareness and fully justifies that the definition of a new meeting place be launched as soon as possible.

Keywords: Agriculture — Agronomy — Conscience — Ecology — Responsibility — Long duration.

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