HUSBANDING CREATION AND THE TECHNOLOGY OF AMELIORATION IN THE WORKS OF GABRIEL PLATTES

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Abstract. In this paper I will try to investigate some of the ways in which husbandry, a recurrent topic in Gabriel Plattes' works, was considered to be the recipe for bringing salvation in religious and economic manner. I will argue that proper methods of husbandry advocated by Gabriel Plattes, accompanied by a technological vision of amelioration, have been able to provide the foundation for healing the land and the human soul. Technological innovation, good measures of husbandry of the land and of the soul are able to ameliorate the economic estate of the nation and also to restore the human condition held prior to Fall. Experimental husbandry of the land and of the soul includes: agricultural innovation which could restore the plenty of the Garden of Eden, medicine which could solve the problems of disease, education reformation which could cultivate the young, and general economic reform which could bring undreamed of prosperity. Inspired from the Baconian tradition, Plattes reformulates the view on husbandry, promoting a new type of 'integrated science' able to cultivate the land and the human soul as well. Plattes contribution lies in providing a number of 'technologies of amelioration' for the material of Creation (soil, plants, human beings), technologies of salvation in an economic and religious manner.

Keywords: husbandry, Gabriel Plattes, Hartlib Circle, technologies of amelioration, technologies of salvation

Introduction

When we contemplate the seventeenth century England interest in husbandry, questions about the conditions for the emergence of such novel ideas rightly come to the fore. Husbandry (regarded as an experimental science able to ensure abilities in treating plants, far exceeding of the botanists' excessively concerned with theoretical knowledge) was able not just 'to heal' the land, but also to ensure 'the healing' of the fallen human being. Amelioration of the human soul and of the nation was a task requiring special attention and specific projects 'scientifically'[1] framed. Husbandry was considered the key to salvation, providing solutions for curing the

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fallen estate of human being.

In the mid-seventeenth century, the problem of husbandry was very much debated inside the Hartlib Circle.[2] Samuel Hartlib, the center of a wide circle of correspondents, acted as a publicizer, sharing, printing, and even budgeting a significant number of interesting and novel ideas, helping to generate an even wider dissemination of inventions and ideas. In 1650 Hartlib turned his attention to husbandry. This shift of attention from spiritual, religious, educational, and political matters may be also connected with the interest manifested by one of the lately less acknowledged figures of Hartlib Circle, Gabriel Plattes, on the topic of husbandry, exploitation of the soil, cultivation of the land, and agricultural technology. Should the interest for husbandry in the mid-seventeenth century England be worth to be explored, this becomes even more urgent if we seek to investigate Plattes' contribution to the field. While scholars have devoted a great deal of attention to the Hartlib Papers[3] and also to the problem of culture and cultivation in the mid-seventeenth century England,[4] the figure of Gabriel Plattes - who is, for sure, one of the pioneers in the field of husbandry - is still unknown. This situation was completely different at that time, Plattes' name and works being very popular among other members of the Circle, most of the tracts on husbandry published after 1650 mentioning his name and contribution.[5]

In this paper I will try to investigate some of the ways in which husbandry, a recurrent topic in Plattes' works, was considered to be the recipe for bringing salvation in religious and economic manner. I will argue that proper methods of husbandry advocated by Gabriel Plattes, accompanied by a technological vision upon amelioration, were able to provide the foundation for healing the land and the human soul. Technological innovation, good measures of husbandry of the land and of the soul are able to ameliorate the economic estate of the nation and also to restore the human condition held prior to Fall. Experimental husbandry of the land and of the soul includes: agricultural innovation which could restore the plenty of the Garden of Eden, medicine which could solve the problems of disease, education reformation which could cultivate the young, and general economic reform which could bring undreamed of prosperity. Taking inspiration from the Baconian tradition of experimentation, Plattes reformulates the view on husbandry, promoting a new type of 'integrated science' able to cultivate the land and the human soul as well. He developed a more empiricist, more experimental view on husbandry, placing at the very core of amelioration the idea of technological advancement. Plattes contribution rests in providing a number of 'technologies of amelioration' for the material of Creation (soil, plants, human beings), technologies of salvation in an economic and religious manner.

Gabriel Plattes' Interest in Husbandry

Although Plattes' works have significantly contributed as parts to an important body of literature produced in the seventeenth century and after (literature concerning the topic of husbandry), so far Plattes has not received the amount of

attention and thorough study he deserves. Apart from Charles Webster, who dedicated to Plattes[6] and especially to *Macaria* a number of studies,[7] I could only find passing references and rather short discussions of his name in the larger context of the Hartlib Circle,[8] the seventeenth-century utopian movement[9] or in more general studies of seventeenth-century English politics and literature. This is a pity, because a thorough investigation of Plattes' work in the appropriate context can reveal many interesting and still only partially understood things about the context in which the topic of husbandry emerged and about the content of this interesting topic which seemed to exert widespread and influence on the agricultural studies developed later on, in the seventeenth and eighteenth century.[10]

Very little is known about Gabriel Plattes; he was probably born at the beginning of the century.[11] There is little evidence regarding Plattes' career in the period preceding his association with the Hartlib Circle. He seems to have been William Engelbert's assistant,[12] to whom he dedicated his first two books: *A Discovery of Subterraneall Treasure, viz., of all manner of mines and minerals … and also the art of melting, refining, and assaying of them* and *A Discovery of Infinite Treasure, hidden since the World's Beginning. Whereunto all men, of what degree soever, are friendly invited to be sharers with the Discoverer*, both of them published in 1639. These two books were designed to be complementary. *A Discovery of the Infinite Treasure* was very popular, frequently read and quoted.[13] Apart from presenting intensive schemes of husbandry, the book also deals with alchemical experiments, transmutation experiments and new inventions, which were supposed to help the economic advance of the country. The 'scientific' and technological sections were interspersed with remarks about ethical and economic issues, pointing to a religious obligation which Plattes believed that people like him had to nourish in themselves and to disseminate it to the widest public in order to contribute to the improvement of the estate of the nation.

These first two books published by Plattes were famous and highly appreciated in England[14] and abroad,[15] Marin Mersenne even expressing his intention to translate Plattes' books in French.[16] The main aim of the books was to construct solidarity as both the instrument and the goal of a program of amelioration.[17] They contained elements developed later on, such as the importance of husbandry based on innovation and intensive agricultural technologies, the inutility of war,[18] the metaphor of the hive[19] used to describe the growth of the population seen not as a liability but as a driving force of agricultural innovation, and the idea of erecting a College where this new science could be taught, The College for Inventions in Husbandrie.[20]

> … these things being duely observed, will produce more generall benefit, then many greater studies; and seeing that Husbandry did not onely build, but also maintaine all Schooles […] we will erect a College for Inventions in Husbandry, in retribution of their former supplies to Learning. (*A Discovery of Infinite Treasure*, 72)

Gabriel Plattes' name was associated with two of the most active personalities that worked in London at that time: the mathematician John Pell and the agricultural

improver Richard Weston.[21] Webster claimed that it was due to the association with John Pell, a promoter of Baconian experimental science, that Plattes changed his style and became more of an adept of the 'experimental' way.[22] Webster also suggested that the same John Pell was responsible for introducing Plattes to Samuel Hartlib.[23] Regardless of how the two got acquainted, they were connected through their common interests in reviving the national economy and in promoting schemes for social amelioration, everything being drawn together in the context of millennial expectations. Being associated with these illustrious men and with Samuel Hartlib, Plattes developed intensive schemes of husbandry inspired from the Baconian tradition of experimentation upon nature, mixed with Hartlibian projects of amelioration. However, he added his personal vision of technological improvement.

Plattes considers vegetation to be the result of a process of combustion: the combustible fatness of the land causes vegetation by means of its vaporizing and rarefying quality in the presence of the warmth of the sun.[24] Dung is destined to add combustible fatness to the land and fertilization with manure is a process of transforming the incombustible fatness into a combustible one.[25] If Bacon described the process of germination as the transformation of the watery-airy quality (attached to inanimate spirit of the seed) into oily-fiery (attached to animate spirit of the seed),[26] Plattes considered germination as the process of transformation into vapors of the combustible fatness of the seed in the presence of the heat,[27] while the incombustible fatness contained in the seed congealed the vapors and gave them form. Like Bacon, Plattes shared a unified, integrated vision of the universe. The same material is used in plants as in human beings. Therefore, Plattes' vision of technology is destined to ameliorate both plants and the human soul. In the context of millennial expectations shared by members of the Hartlib Circle, God was willing to allow human beings to restore the qualities lost through the Fall - and the members of the Hartlib Circle understood it like a call to ameliorate the material of Creation. The same methods and technologies are destined to ameliorate soil, plants and human estate as well, bringing salvation both in a religious and an economic manner, thus making England the richest, happiest and most peaceful country on earth.

The New Husbandry

One of the reasons for the deep interest manifested by the seventeenth century people in the topic of husbandry could be traced back to the Baconian tradition of experimentation, which places the study of nature at its very core. But the continuation of the Baconian ideas went along with the creation of a specific type of ethics, the ethics of direct participation in the transformation of the world.[28] A. Low has argued that emphasizing the practical work and experimentation, Bacon insisted that, under God's benevolent eye, humanity should take its destiny into its own hands, reconsider the nature of that course and start a long process that would put work in a different perspective: difficult and painful still, but carrying in itself the great promise of human advancement and of peaceful prosperity.[29] Thus, for the mid-seventeenth century generation of experimenters, labor and the study of nature gained a new

pioneering perspective: God was willing to allow people to achieve salvation, and perpetual labor, paired to an attentive study of nature, represented the way to attain it. Significantly, agricultural labor, while often said to be a consequence of the Fall, was nonetheless represented more as a fulfillment than as a punishment. As Bacon often argued,[30] the Christian farmer would expect God to reward his efforts if he followed a methodological course which allowed him to pray and cultivate his soul while cultivating his land.[31] The improvement of the land was placed in a completely new light, a light that emerged from a moral point of view. A. McRae considers that the word 'improvement' has gained a different and 'improved' meaning starting with the seventeenth century. This new meaning draws together legal, religious, moral, and economic implications in order to justify the radical processes of change that were happening in England at that time.[32]

Gabriel Plattes was the first member of the Hartlib Circle who devoted his attention to the topic of husbandry and who expressed an opinion based on the first-hand experience of current practice.

> Former books written upon this subject, were written by men which had no attained to any considerable perfection in the Knowledge of Nature, and such as had but glimmering light of such great secrets, as Nature hath heretofore locked up in her Store-house, and so were ignorant in the fundamental points and causes of Vegetation and Multiplication. Whereupon I concluded that the Teachers and the Teached were nothing else but the blind leading of the blind, by which we all fell into the ditch. (*The Profitable Intelligencer*, HP, PAM 17, sig. A2r)

Members of Hartlib Circle criticized former agricultural writings (Virgil, Pliny, Columella) because they failed to provide a 'rational' and an 'experimental' basis for their practice,[33] found inspiration for such an approach in Bacon's experimental philosophy, and they consciously attempted to frame their agricultural writings in Baconian terms.[34] But while Baconian science became an integral part of plans for economic and social development, the followers of Bacon aimed at becoming 'servants' or 'ministers' of nature. The experimental philosopher was confident that his dedication to social service, to open communication of useful knowledge, and to the adoption of rigorous empirical procedures, was consistent with his Christian moral code.

Members of the Hartlib Circle discovered in Bacon's natural philosophy a coherent system consistent with the ethics of direct participation in the transformation of the world.[35] It was also framed with reference to the millennial expectation of man's dominion over nature. Hence it is not surprising that Bacon's experimental philosophy, the ethics of direct participation in the transformation of the world, millennial expectations, and a pansophical approach of pedagogy were assimilated into the general rhetoric of the members of the Hartlib Circle and influenced the new vision on husbandry. By tilling the soil, by taming the wild, by making the sterile fertile, the members of the Hartlib Circle were sure that they could be able to provide

the pattern for salvation.[36] By cultivating, grafting, improving plants (as a main source of food in his fallen condition), man would gradually improve his condition, contributing thus to the improvement of his health and to the prolongation of his life.[37] Proper methods of husbandry and pioneering technologies in the field would provide salvation in a religious manner. In this new interpretation of the Genesis, the accent has moved from the emphasis put on the importance of work to an insistence on the importance of 'amelioration' of the 'cultivated material'. This is the reason why new husbandry and subsequently, new agriculture needed improved technologies: because new, improved technologies were able to ameliorate the 'cultivated material', bringing salvation in a religious manner. The truths of Scripture were to be extracted by experimental science in accordance with the prophetic books of the Bible. Therefore, H. Trevor Roper considered that the Baconian science had been adequated to the expectation of the Millennium.[38] At the advent of the Millennium, man would be restored to his original perfection and would enjoy once again the paradisiacal estate that Adam had forfeited. Related to, gardening becomes a very important piece of knowledge in the millennial context, because 'gardening and husbandry were the major prelapsarian occupations'.[39] Another source of inspiration was Virgil's *Georgics*.[40] The advices on practical husbandry contained in the Virgil's *Georgics* were read with great seriousness, and the poet was regarded as a key figure in the exploration and the investigation of the natural world. The variety of topics discussed in the *Georgics* also inspired a broad approach to natural philosophy and, as M. Leslies has put it, 'authorized philosophical elite to devote itself to the study of nature and experimental philosophy'.[41] But the concern with redeeming the time and the fascination with paradise gardens, along with the spiritual fulfillment that might be obtained through them, suggests that georgic husbandry was authorized to some degree by the millenarianism that persisted throughout the decades of the mid-seventeenth century.

The pansophic plans promoted by the members of Hartlib Circle can be considered another source of inspiration that provided some of the necessary elements for the development of husbandry. Webster argued that pansophia served as a unifying principle for the diverse ideas regarding the advancement of knowledge and piety, counteracting the secular tendencies of Baconianism and providing a basis for practical proposals.[42] Through education the Kingdom of God came within the reach of each generation. The new pedagogy sought to 'cultivate' the children's minds in the same way as one would 'cultivate' the trees and the plants. In order to restore the qualities lost in the Fall, education should enhance the study of nature as the main way in which one can understand and glorify God. Efficient education for all sections of the community was a necessary condition for achieving mastery over nature and subsequent social amelioration.[43]

In this context, there is no surprise that one of the central methods by which the members of the Hartlib Circle sought to study God in nature was the practice of husbandry.[44] Gabriel Plattes was the first writer of the Hartlib Circle who embraced the expression of this new tradition of agricultural writings.[45]

Plattes considered that the Kingdom of God on earth required equal attention

to spiritual and to bodily needs. Bringing paradise on earth was considered to be the result of everything appertaining to the control of the natural world. Plattes claimed to have been, ever since childhood, "a strict observer of the great losse that came to this Country, partly through ignorance, and partly through negligence, in rayfing that benefit out of the superficiall, the subterraneall Treasures of the Earth."[46] It seemed he was in the perfect condition to approach such a task and to elaborate intensive schemes of husbandry in order to bring the Kingdom of God on Earth. Plattes adopted an empiricist approach to knowledge and his experience in mining and agriculture were similar, both calling out for rationalization and innovation. Proper schemes of improving and ameliorating the land were the same schemes used for improving and ameliorating the human material cultivating the land, calling thus for cultivation of the mind and for a new pedagogy of virtues. The process of cultivation and amelioration opens very interesting theological interpretations. God is willing to allow for the 'healing' of some parts of the fallen nature and technological improvements are designed to help along the amelioration process. Using technology we can help, speed, and improve the germination of the seeds and the flourishing of the human virtues. Fertilization with manure is regarded as a precautionary process, as a preventive and curative medicine, offering proper nourishment for the incombustible and combustible fatness enclosed in seeds, soil, and humans.[47]

Agriculture, mining, and metallurgy are restorative sciences, aiming to 'heal' the fallen nature. Metals and plants are generated, germinated, and grow due to the possession of a vaporing, rarefying quality (metals are 'generated in the belly of the Earth' due to the vaporing quality of the combustible fatness of the earth, while seeds are 'germinated' as a result of the vaporing and rarefying quality of the same combustible fatness of the earth).[48] All of them are operating with the same material of Creation, and aim to improve the 'chemical' process of generation. This is the reason why the same technologies could work for soil and plants as well as for human beings.

Plattes was confident that good methods of husbandry of the land, along with technological improvement, could solve all problems and bring prosperity and salvation to the whole nation.[49] All his work was elaborated under the strict conviction that if his advices were to be followed, England would reach salvation both from an economic and a religious point of view. If in his first two books (*A Discovery of Infinite Treasure* and *A Discovery of Subterraneall Treasure*) (1639) his interest was focused more on mining, metallurgy and intensive schemes of husbandry, starting with *Macaria* (1641), he became interested in other industries - for example, in the application of chemistry to a wide array of operations such as the preparation of medicines.[50] The College of Experience, an institution reminiscent, both in its functions as an institution of the state and in its particular scope of experimental investigation, of the Baconian Solomon's House, was consistent with Hartlib's Offices of Address (The Office for Accommodations and The Office for Communications) and with Boyle's Invisible College. Another tract on husbandry was issued by Plattes in 1644, *The Profitable Intelligencer*.[51] This tract was intended to be an advertisement for a wider work entitled *The Treasure House of Nature Unlocked*. Unfortunately, this book has never been

published. In another short essay, called *A Caveat for Alchemist* (1655), Plattes argued that alchemical transmutation was possible in principle but he stressed the importance of first-hand knowledge in mineralogy, chemistry and natural history.[52] Plattes' methodological principles were expressed in accordance with Bacon's experimental philosophy, emphasizing the importance of conducting experimental studies in refining metals and proposing theories to explain geological phenomena.[53] In fact, transmutation, mining, metallurgy, and chemistry were regarded as subsidiary long term objectives while the most important objective was to elaborate proper methods of husbandry able to improve the land and the human estate.

As for the 'scientific' agriculture, Plattes devoted considerable attention to the plantation and cultivation of fruit trees; he also designed an instrument for the mechanism of sowing corn. His advices regarding the issue of corn plantation were very popular at the time and stirred long discussions among his contemporaries.[54] In England, his inventions contributed to the better cultivation of corn, "saving nineteenths of the ordinary amount of seed and securing a heavier crop."[55] The problem concerning the better cultivation of corn was seriously discussed by his successors.[56] In *The Profitable Intelligencer*, Plattes talks about methods of improving the land such as fertilization with manure. He developed a theory about the quality of manure according to its composition. Another theory, connected to the previous one, focused on the quality of seeds and provided better ways of improving agriculture production.[57]

Judging by their practical results, Plattes' proposals for 'scientific' agriculture were not to be considered a revolution in husbandry. His major contribution rests in his rational approach to the field, in the justification of his detailed proposals in terms of a theory of plant nutrition which incorporated a primitive idea of cyclical chemical change. He was the first English author to have ever approached this degree of sophistication in the treatment of agriculture.[58] Even if theories developed by Plattes made a rather modest contribution to the enrichment of the nation, his desire to see the 'scientific' agriculture and husbandry of the nation growing more productive was evident in all his works.

Medicine and the healing of diseases

The Baconian tradition of experimental science is also advocated by Plattes when he talks about medicine. The College of Experience imagined in *Macaria*, a research institution reminiscent of Solomon's House in *New Atlantis* and of the experimental laboratories in Andreae's *Christianopolis*, has as its major task the gathering of materials for the advancement of knowledge and the adoption of practical solutions. The members of the College of Experience, being both doctors and diviners, hold both the body and the soul in their care, and their activities are dedicated mainly to the providing of medicines which can heal the body and the soul. 'The College' also supervises the training of parsons (who are medical doctors as well), looking after the wholesomeness of both body and spirit, *cura animarum et cura corporum*. This is a very original interpretation of the Baconian project of Solomon's House. The

main function of Solomon's House is to relate the natural to the divine knowledge, and this function is rediscovered inside the 'College of Experience.' Plattes translated the general medical aspects of Solomon's House into more practical terms. The members of the 'College of Experience' make experiments with new medicines and new treatments and apply them to the inhabitants of Macaria, but they also cure their souls. Plattes has drawn upon more than one tradition here. There are some elements (such as the study of mining and metallurgy) which can be related to the Paracelsian tradition of 'the cure of body and soul.'[59] The ideal healer, being both a physician and a diviner, must know in detail the patient's disposition of body and soul in order to select a proper cure.

> *Schollar*. But you spoke of health, how can that be procured by a better way than wee have here in England?
> *Traveller*. Yes very easily; for they have an house, or College of experience, where they deliver out yeerly such medicines as they find out by experience; and all such as shall be able to demonstrate any experiment for the health or wealth of men, are honourably rewarded at the publike charge, by which their skill in Husbandry, Physick, and Surgerie, is most excellent.
> *Sch*. But this is against Physicians.
> *Trav*. In Macaria the Parson of every Parish is a good Physician, and doth execute both functions, to wit, *cura animarum, & cura corporum*; and they think it as absurd for a Divine to be without the skill of Physick, as it is to put new wine into old bottles; and the Physicians being true Naturalists, may as well become good Divines, as the Divines doe become good Physicians.
> *Sch*. But you spoke of grat facilitie that these men have in their functions, how can that be?
> *Trav*. Very easily: for the Divines, by reason that the Societie of Experimenters is liable to an action, if they shall deliver out any false receit, are not troubled to trie conclusions, or experiments, but onely to consider of the deversitie of natures, complexions and constitutions, which they are to know, for the cure of soules, as well as for bodies. (*Macaria*, HP, PAM 07, 5-6)

Plattes' view on medicine emphasized not only the aspect of treating several diseases of the body but included also the treatment of the soul. This was the result of the mixing of several influences (the Baconian tradition of experimental science, the Comenian idea of a pansophic system of learning, the Andreaean perspective upon the purposes and the use of the laboratory, the Paracelsian tradition of curing the body and the soul) but added some personal contributions, such as the perspective on medicine seen as a 'husbandry' of the body and of the soul, and his determination to make the state responsible for the health and the wealth of the nation. The husbandry of the land, the study of the properties of metals, minerals and vegetables, consists not only of elements which can contribute to the advancement of learning in the field of agriculture but also of methods of treating several diseases and of curing the body and the soul of the fallen human being. The abilities required in treating plants are the

same abilities that are needed in order to heal the body and the soul; the good measures put to use in the husbandry of the land are also capable to provide rules and principles for the husbandry of the soul.

Plattes believed that clergymen should take an active part in secular affairs. One of the outstanding aspects of *Macaria* is the author's determination to put responsibility in the hands of the state and of the clergy. In his view, this should provide an excellent basis for a national medical service. The parsons should administer medicine along with fulfilling their pastoral duties. In *A Caveat for Alchymists,* Platte is even proposing that the overseer for the poor (the parson) should teach them improved techniques of agriculture. The sanity of the body and of the soul is very well connected to the idea of husbandry. Good measures of husbandry of the land will provide a cure for the body and for the soul, thus restoring the conditions that existed prior to the Fall. And all one needed in order to cure society were good measures of husbandry and a strong will to achieve this goal.[60]

The New Pedagogy

Plattes' approach to education draws on the already familiar comparison between the process of education and the cultivation of plants, a theme influenced by both the terminology and the metaphors of Bacon and Comenius. The dominant features of the new education are practical divinity and the empirical sciences, the guides to moral behavior and material well-being. Education was seen both as a possibility of salvation and as a source of perpetual reminder of human failure. Through education the Kingdom of God came within the reach of each generation, but failure to exploit its potentialities had perpetuated man's ruinous condition.[61] Reforms of educational practice and the accompanying new pedagogy were closely related to arguments about how to restore Adamic knowledge.[62] Comenius in *Didactica magna*[63] spoke about the cultivation of "those plants of Paradise, Christian children" that were constantly overcome by thorns and brambles, highlighting thus the idea of cultivating (husbanding) the human mind.[64] Schoolmasters were as necessary as ministers in guiding society towards the New Jerusalem. God has sown the seeds of virtue. It is our responsibility to sow and cultivate the seedlings. Teachers, physicians of the mind (medicos animarum), having apprehended the nature of virtue, have in it their power to see the origins of all vices and to replace them by virtue. By means of the 'celestial agriculture', the new pedagogy allows the teacher to harvest the fruits of knowledge and to lay the foundation of the 'celestial state'. Efficient education for all sections of the community was a necessary condition for achieving mastery over nature and for subsequent social amelioration. According to the new pedagogy, teachers have the power to provide a remedy for the disease of both church and state, playing thus a crucial role in the reformation of the two institutions.[65]

The aim of education is to produce 'good commonwealth men', replacing the aim of scholastic learning by the ideal of public service. The degree of 'usefulness' or 'practical' application is the new criterion for judging the value of knowledge. Pansophia, eagerly embraced by the members of the Hartlib Circle, provided a

unifying principle for very diverse ideas on the advancement of knowledge and piety, contributing to the general aim of education seen as a way of restoring the condition and the knowledge that human beings possessed prior to the Fall.

Plattes' view on education was inspired from this tradition. Being faithful to the criterion of 'usefulness', he values above all the practical application of education and designs the new pedagogy in accordance with the principles of husbandry.

> … these things being duely observed, will produce more generall benefit, then many greater studies; and seeing that Husbandry did not onely build, but also maintaine all Schooles, I could with that it was better fortified, being the very foundation of a prosperous Common-wealth, and if every one would equalize my benevolence, who have reaped double benefit out of the Schooles: we will erect a College for Inventions in Husbandrie, in retribution of their former supplies to Learning. (*A Discovery of Infinite Treasure*, 72)

New methods of pedagogy could bring salvation in a religious manner. In *Macaria*, the parsons - who are, at the same time, medical doctors - are real physicians of the mind, curing the vicious body and soul of all that is deleterious and replacing these destructive penchants with virtues. Webster[66] claims that Plattes hasn't made any reference to educational reform in *Macaria* but I would suggest that we can credit Plattes for introducing some educational reformation elements. The pedagogical aspect of knowledge in *Macaria* involves a new type of learning which can connect natural philosophy and divine revelation. The idea of parsons-medical doctors contains in itself the idea of educational reform. Their main function is to cure the body and soul using a special pedagogy based on medical and philosophical remedies. The parsons should administer medicine in the course of pastoral duties, curing vices, planting virtues in the souls of men and teaching (using a new pedagogy based on the principles of good husbandry) their parishioners how to cultivate them. I would say that in *Macaria*, Plattes went beyond his predecessors in claiming that state institutions should be actively involved in this mission and should play a crucial role in the reformation of the individual, but also in the reformation of the church and of the state. *Macaria* was addressed to the High and Honourable Court of Parliament and aimed to bring attention towards reform projects regarding politics, religion, economic development, and education, projects developed within the Hartlib Circle by people like John Amos Comenius, John Dury and Gabriel Plattes himself. In *The Profitable Intelligencer*, he proposed a Council of Husbandry composed of experienced practitioners, while in *A Caveat for Alchymists* he manifested his intention to speak in front of the Parliament about his propositions of establishing a Laboratory where to test his new inventions and methods.

> But now I have been a Petitioner to the High and Honourable Court of Parliament, that I may demonstrate my ability, to do the Common-wealth of England service, which service consisteth in three things principally, to wit, to shew how the husbandry of this Land may be so improved, that it may

> maintain double the number of people which now it doth, and in much more plenty: also to shew how the Art of Physick may be improved: and lastly, to shew the Art of the transmutation of Metalls, if I may have a Laboratory, like to that in the City of Venice, where they are sure of secrecy, by reason that no man is suffered to enter in, unless he can be contented to remain there, being surely provided for, till he be brought forth to go to the Church to be buried. (*A Caveat for Alchymists,* HP, PAM 54, 87-8)

Plattes announced that he had petitioned the Parliament and had proposed reforms regarding husbandry and medicine as well as education, because, based on his former ideas, presented in *A Discovery of Infinite Treasure* and in *Macaria*, we can credit him for the depiction of a kind of Laboratory with a view toward the advancement of education, inspired from Andreae's laboratories. In fact, it seems that there is no record of Plattes' having in fact petitioned the Parliament, Hartlib telling later to Winthrop that Plattes never made any demonstration in front of the Parliament of the possibility of the Lapis Philosophorum.[67]

Even if Plattes did not succeed in his attempts to address the Parliament, for sure he held a great deal of influence upon his contemporaries. Hartlib's Office of Address of Accommodations and the Office of Communications have drawn upon many ideas, some of them formulated by Plattes. While the Office of Accommodations had less of a bent towards educational purposes, the Office of Communication formed the basis of the state patronage of learning, an idea formerly expressed by Plates. Shortly after Plattes' death, Robert Boyle's Invisible College (1646) also proposed a project for the advancement of learning, focusing its work on chemical laboratories.

Conclusion

Although the theories developed by Plattes are not considered to be revolutionary - at least not in terms of their practical results, since they have not had a considerable contribution to the enrichment of the nation, his major contribution rests in his 'rational' and 'scientific' approach to the field of husbandry. He influenced studies on husbandry developed later, in the course of the seventeenth and eighteenth centuries, and several books concerned with agricultural innovations are mentioning his name.[68] His studies were very popular among the members of the Hartlib Circle, both among those from England and among those living abroad (France, Denmark and even Germany). The first American edition of Plattes' *Discovery of Subterraneall Treasure,* printed by Robert Bell (Evans no. 18732), was published in Philadelphia, 1784, other issues of his work being published in Philadelphia in 1792 (Evans no. 24697) and 1796 (Evans, no. 31174).[69] His works abound in strictly utilitarian self-help schemes for the common man and he was anonymously criticized because he was "too confident for the improvement of those secondary meanes as if men should be the lesse beholden to God and so inclined to Atheisme".[70] Although he was criticized for his 'illicit' point of view, his influence can be seen best in the shift that occurred in

the year 1650 in the type of publications that emerged from within the Hartlib Circle. Indeed, the interest shifted, from publications primarily concerned with educational and religious purposes to those concerned with agriculture, technology and social amelioration, but still inscribed within a religious framework.[71] In August 1650, A Council of Trade was established (Plattes proposed in *Macaria* one council of trade by land and another one for trade by sea), two members of Hartlib Circle being appointed to this new council: Sir Cheney Culpeper (an admirer of Plattes' work) and Sir Robert Honywood. Cressey. Dymock's ambitious proposal for 'husbandry learning' was made in 1651, and was complementary to Plattes' proposal for a College of husbandry.[72] Hartlib's Office of Address of Accommodations and the Office of Communications advocated for some of the ideas developed by Plattes, such as the establishment of a state patronized institution for the advancement of learning, while Robert Boyle's Invisible College proposed chemical laboratories for the advancement of learning. John Evelyn's *Sylva, Or a Discourse of Forest Trees, and the Propagation of Timber in His Majesties Dominions* (1664) established tree planting as a central component of land improvement.[73]

Webster[74] argued that Plattes' work was consistent with the three points program derived from *A Discovery of Infinite Treasure* and *A Discovery of Subterraneall Treasure* and announced in *Macaria* and *A Caveat for Alcymists*. I would say that Plattes programme was actually based on four points. Webster considered the three points to be: the religious and political framework, Plattes' proposals for economic planning and development and Plattes' own projects for the application of science to the improvement of medicine, agriculture, and technology. To these points I would add Plattes' proposals for educational reform, and I would argue that the pedagogical aspect of knowledge was a constant interest throughout his work. Manifested from the very beginning, Plattes' new pedagogy was trying to constantly connect experimental science, natural philosophy and divine revelation.

This essay argues in favor of the idea that Gabriel Plattes has reformulated traditional husbandry. He proposed a type of new and 'integrated science', able to treat and ameliorate plants as well as the human soul. The new husbandry is based on a series of technologies intending to transform nature, to work within Creation. Proper methods of husbandry were considered able not just to 'heal' the land but also restore the fallen human being. Measures of husbandry were supposed to contribute to agricultural innovation and to general economic reform, to restore the abundance that existed in the Garden of Eden and to bring undreamed of prosperity. But good measures of husbandry of the land were also measures of husbandry of the soul, being capable to heal the diseases of the body, to cure the vices of the soul, to plant and to cultivate the virtues. If all these steps were to be followed systematically, husbandry would have guaranteed undreamed of prosperity and religious salvation.

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References

[1] To avoid anachronism, I mention that the usage of the term 'scientific' in this paper is equivalent with 'rationally and experimentally framed'.

[2] Among important figures of the Hartlib Circle devoting a great deal of attention to the topic of husbandry we can mention Gabriel Plattes, Cressey Dimock, Ralph Austen, Walter Blith, Richard Child, John Beale, Richard Weston, Samuel Hartlib.

[3] Webster, Ch., *The Great Instauration. Science, Medicine and Reform 1626-1660* (London: Duckworth, 1975); Webster, Ch., (ed.), *Samuel Hartlib and the Advancement of Learning* (Cambridge: Cambridge Univ. Press, 1970); Webster, Ch., *The Intellectual Revolution of the Seventeenth Century* (London: Routledge, 1974); Trevor Roper, H., "Three Foreigners", in *Religion, the Reformation and Social Change; and Other Essays*, ed. H. Trevor Roper, revised third edition (London: Secker&Warburg, 1984); Turnbull, G.H., *Hartlib, Dury and Comenius. Gleanings from Hartlib's Papers* (Liverpool and London: Liverpool University Press, 1947); Turnbull, G.H., *Samuel Hartlib: A Sketch of his life and his relations to J.A. Comenius* (London: University Press of Liverpool, Hodder &Stoughton, 1947); Turnbull, G.H., *Samuel Hartlib with special regards to his relations with J.A. Comenius* (London, 1919); Cagnolati, A., *Il circolo di Hartlib: riforme educative e diffusione del sapere, (1630-1660)* (Bologna: CLUEB, 2001); Clucas, S., "The Correspondence of a Seventeenth-Century 'Chymical Gentleman': Sir Cheney Culpeper and the Chemical Interests of the Hartlib Circle", *Ambix* 40(1993): 147-70; Clucas, S., "Samuel Hartlib, Intelligencing and Technology in Seventeenth Century Europe" in *Leonardo da Vinci und Heinrich Schickhardt Zum Transfer technischen Wissers im vormodern Europa*, ed. R. Kretzschmar and S. Lorenz (Stuttgard: Verlag W. Kohhammer, 2010), 58-75; Greengrass, M., "Archive Refractions: Hartlib's Papers and the workings of an Intelligencer", in *Archives of the Scientific Revolution. The Formation and Exchange of Ideas in Seventeenth Century Europe*, ed. M. Hunter (Woodbridge: The Boydell Press, 1998), 35-47.

[4] Law, A., *The Georgic Revolution* (Princeton: Princeton University Press, 1985); Thirsk, J., "Making Fresh Start: Sixteenth Century Agriculture and the Classical Inspiration", in *Culture and Cultivation in Early Modern England: Writing and the Land*, ed. M. Leslie, T. Raylor (Leicester: Leicester University Press, 1992), 15-34; Di Palma, V., "Drinking Cider in Paradise: Science, Improvement, and the Politics of Fruit Trees", in *A Pleasing Sinne: Drink and Conviviality in the Seventeenth-Century England*, ed. A. Smyth (Cambridge: Boydell and Brewer, 2004).

[5] I will discuss this aspect in more detail later. See notes 68, 69, 71.

[6] Webster, Ch., (1975); (1970); (1974).

[7] Webster, Ch., *Utopian Planning and the Puritan Revolution: Gabriel Plattes, Samuel Hartlib and Macaria* (Welcome Unit for the History of Medicine, Oxford, 1979); Webster, Ch., "Macaria, Samuel Hartlib and the Great Instauration", *Acta Comeniana* 26 (1979): 146-64.; Webster, Ch., "The Authorship and Significance of Macaria", *Past and Present* 56(1972): 34-49.

[8] Trevor Roper, H., (1984); Turnbull, G.H., (1947); (1947); (1919); Cagnolati, A., (2001); Clucas, S., (1993); (2010); Greengrass, M., (1998).

[9] Davis, J.C., *Utopia and the Ideal Society: A Study of English Utopian Writing 116-1700* (Cambridge: Cambridge University Press, 1981); Dickson, D.R., *The Tessera of Antilia. Utopian Brotherhoods & Secret Societies in the Early Seventeenth Century* (Leiden, Boston, Köln: Brill, 1998); Appelbaum, R., *Literature and Utopian Politics in Seventeenth Century England* (Cambridge: Cambridge University Press, 2002).

[10] See notes 68, 69, 71.

[11] Webster, Ch., (1979), 15.

[12] See also Hartlib, S., *Ephemerides*, 1639, part 3, HP 30/4/21A; 30/4/25A.

[13] See the following three notes.

[14] Several people were interested in Plattes' books. Among them we can mention Peter Smith (Copy letters in scribal hand A, Peter Smith to Beale?, HP 67/23/11B), John Beale (Letter John Beale to Hartlib, 23 February 1657, HP 62/22/1B), Sir Cheney Culpeper, who asked Hartlib several times to send him Plattes' works and he tried to put into practice some of Plattes' advice concerning the cultivation of corn and the use of saltpeter and pigeon dung (Letter Sir Cheney Culpeper to Hartlib, 20 November, 1644, HP 13/55B; Letter Sir Cheney Culpeper to Hartlib, 4 January 1645, 13/59A; Letter Sir Cheney Culpeper to Hartlib, 21 January 1645, 13/66B; Letter Sir Cheney Culpeper to Hartlib, 28 January 1645, 13/69A; Letter Sir Cheney Culpeper to Hartlib, 20 May 1645, 13/88B; Letter Sir Cheney Culpeper to Hartlib, 12 November 1645, 13/122A; Letter Sir Cheney Culpeper to Hartlib, 17 July 1645, 13/95A; Letter Sir Cheney Culpeper to Hartlib, November 1645?, 13/278A; Letter, Cheney Culpeper to Hartlib, 20 Sept 1657, 42/15/11B), maybe Lord Robartes (Copy letters in scribal Hand F, Hartlib to [Lords Robartes?] &?, April & 28 May 1640, HP 7/50/2A).

[15] Samuel Hartlib mentioned in his *Ephemerides* that Plattes inventions in the matter of corn settings were requested by people from Denmark. Hartlib, S., *Ephemerides*, 1639, part 3, 30/4/24A: "Hee conferred with Plattes and causes him to make one of his Instruments of setting of corne which hee it may well send into Denmark." For people outside England interested in Plattes' books see John Morian (Copy Letter in Hartlib's Hand, John Morian to?, in German and Latin, 21 July 1639, HP 37/34B), and also the following note.

[16] Marin Mersenne made frequent references to Plattes' activity in his correspondence to Theodore Haak and John Pell, pressing Haak to pursue Hartlib to undertake further experiments and expressing his intention to translate Plattes' books in French (Copy Letters, Mersenne to Theodore Haak, in French, 20 January 1640, HP 18/2/14A; Lettre de M. Mersenne à T. H. de 12. de Fevr. 1640, HP 18/2/14B, 18/2/15A; AT DOC. 4 Letters Mersenne to Theodore Haak & John Pell, 15 January 1640, HP 18/2/10A, 18/2/10B; Copy Letters Mersenne to [Haak?] & Pell, & Vegelin to? French, latin &English, HP 18/2/4B; Copy letter Mersenne to T. Haak, 24 November 1639, HP 18/2/3A). In fact, a French version of Plattes' *Subterraneal Treasure* exists in a manuscript translated by de Beaulieu and called *La Descouverts des thésors sousterrains par Gabriel Plattes* [c.1678], Bibl. Nat. MC fr. nouv.acq. 3118 (Webster, Ch., (1979), 21).

[17] In *A Discovery of the Infinite Treasure*, A3, Plattes claims in The Epistle Dedicatory to prescribe approved medicine" of "new inventions" which should help to make "this Country the Paradice of the World", while in fact the book offers few concrete proposals: "... there is no approved medicine but this, in an over-peopled Common-wealth to wit, good improvements of the earth; which may be effected by the new inventions contained in this Booke: and there is nothing wanting but willing mindes to make this Country the Paradice of the World." Evidence in support of such an opinion have been expressed by R. Appelbaum. See Appelbaum, R., (2002), 117.

[18] See Plattes, G., *A Discovery of Infinite Treasure* (London, 1639), C-C1; *A Description of the Famous Kingdome of Macaria* (London, 1641), HP, PAM 07, 11.

[19] For the metaphor of the hive see Plattes, G., *The Profitable Intelligencer* (London, 1644), HP, PAM 17 sig. A1-v; for the metaphor of the hive used to describe how could be found methods of increasing the number of population see Plattes, G., *A Discovery of Infinite Treasure*, C2-v2.

[20] Propositions for 'husbandry learning' were also made in *Macaria*, Plattes talking about a Councell of Husbandry, able to enforce laws regarding both agriculture, administration of the land and the relations of landlords and tenants, and in *The Profitable Intelligencer* where he talked about a Council of Husbandry composed of experienced practitioners. This idea was taken up

by Hartlib (The Office of Address), Boyle (The Ifnvisible College), and Cressey Dymock (the College or Society of Good Husbandry).

[21] Hartlib, S., *Ephemerides*, 1639, part 3, HP 30/4/24A, 30/4/26A.

[22] Webster, (1979), 17.

[23] Webster, (1979), 19.

[24] Plattes, G., *A Discovery of Infinite Treasure*, C3. Bacon also sees vegetation as a process of 'combustion', a result of the 'inflammation' of the vital spirit. Bacon, F., *Sylva Sylvarum*, exp. 355-59, 459-60, *The Works of Francis Bacon*, ed. J. Spedding, R.L. Ellis, D.D. Heath (Stuttgart-Bad Cannstatt: Friedrich Frommann Verlag—Günther Holzboog, 1963-1994 [1857-1874]), 14 vols., (hereafter SEH), vol. II. See also Rees, G., "Bacon's Speculative Philosophy", in *The Cambridge Companion to Bacon*, ed. M. Peltonen (Cambridge: Cambridge University Press, 1996), 138.

[25] Plattes, G., *A Discovery of Infinite Treasure*, 23-4; 27.

[26] See Bacon, F., *Sylva Sylvarum*, exp. 355-59, 459-60, SEH, vol. II. See also Rees, G., (1996), 138.

[27] For Bacon, heat is a kind of expanding motion able to dilate bodies and "things which fatten the field, as every kind of dung, chalk, sea sand, salt, and the like, have some dispositions toward heat." Tangible and solid matter (metal, wood, stone, sulphur) manifest no heat at all; yet they have a potentiality for heating ("all dung seems to carry potential heat"). Bacon, F., *Novum Organum*, in *The Oxford Francis Bacon Edition,* ed. G. Rees and L. Jardine (Oxford: Clarendon Press, 1996) volume XI, 239.

[28] Matei, O., "Macaria and the ethics of direct participation in the transformation of the world", *Societate şi Politică* 10(2011): 51-65.

[29] Low, A., (1985), 142.

[30] See Bacon, F., the Preface to *Instauratio Magn*a and *Distribution Operis*, SEH, I.

[31] See Low, A., (1985), 97.

[32] McRae, A., "Husbandry Manuals and the Language of Agrarian Improvement" in M. Leslie and T. Raylor, (1992), 35.

[33] Austen, R., *A Treatise of Fruit-Trees shewing the manner of grafting, setting, pruning, and ordering of them in all respects… with the alimentall, and physical use of fruits. Together with the spirituall use of an orchard: held forth in divers similitudes, etc.* (Oxford, 1653). I will quote form the third edition, *A Treatise of Fruit-Trees…Whereunto is annexed Observations upon Sr F. Bacon's Natural History…The third impression, revised, with additions, etc.* (William Hall for Amos Curteyne, 1665), 165-6: "And likewise I have set my self to the Pracise of this work about Thirty and seven years, endeavouring to find out things of use and profit by Practice and Experience, that I might speak upon better and surer grounds, than some others who have written upon this Subject for Experience guides, and informs Reason in many things in which (without Experience) it would often erre. Some who have taught the Art of Planting Fruit-trees, have been in it only Contemplative men, having little or no Experience in it; so that in many things they have erred, and that grosly, as shall appear in due place."; Blith, W., *The English Improver Improved, or a New Survey of Husbandry. Discovering to the Kingdome, That some Land, both Arable and Pasture, may be Advanced Double or Treble* (London, 1649). I will quote from the third edition, *The English Improver Improved or the Survey of Husbandry Surveyed. Discovering the Improueableness of all Lands: Some to be under a double and Treble others under a Five or Six Fould. And many under a Tenn fould, yea Some under a Twenty fould Improuement*, the Third Impression much Augmented (London, 1653), Epistle Dedicatory: "… compared with our weighty and present affaires, may in some measure be an accidentall cause that Improvements of our Lands go on no better, although materially the cause is in our floth, Prejudice and ill Husbandry."

[34] Ralph Austen even composed a brief tract based on Bacon's aphorisms about husbandry: Austen, R., *Observations on Bacons Natural History as it concerns, Fruit-Trees, Fruits, and Flowers* (Oxford, 1658). Webster also stresses this influence. Webster, Ch., (1975), 470-1.
[35] Matei, O., (2011). Webster considers this type of ethics being of Puritan provenance. Nevertheless, the religious landscape of the time is very complex and Webster's thesis much debated, the problem is still far from being clarified. Concerning Puritan influences on Plattes, the problem has not yet been approached, except from Webster, who associated the entire mid seventeenth century 'scientific' movement with Puritanism. So far I could not find any direct evidence in regard to a Puritan affiliation of Plattes but the issue could be discussed in the light of the late 30 years debates.
[36] Di Palma, V., (2004), 176-7.
[37] See also Bacon, F., *Historia Vitae et Mortis*, SEH, II, 207-8, 236, 179-80, 183. See also Austen, R., *A Treatise of Fruit-Trees…Whereunto is annexed Observations upon Sr F. Bacon's Natural History…The third impression, revised, with additions, etc.*, 40.
[38] Trevor Roper, H., (1984), 253.
[39] Parry, G., "John Evelyn as Hortulan Saint", in M. Leslie, T. Raylor (1992), 137-8.
[40] See also Law, A., (1985).
[41] Leslie, M., "The Spiritual Husbandry of John Beale", in M. Leslie, T. Raylor (1992), 168.
[42] Webster, Ch., (1970), 24.
[43] For supplementing arguments favouring this opinion see Webster, Ch., (1975), 103.
[44] Hartlib wrote that husbandry was "the most profitable Industry unto Humane Society; wherein the providence, the Power, the Wisdom and the Goodness of God, appears unto man more eminently then in any other way of Industry." Hartlib, S., "To the Reader",[Cressey Dymock], *The Reformed Husband-Man* (London, 1651), sig. A2v.
[45] Webster also considers Plattes to be the first member of Hartlib Circle devoting his efforts in this direction. Webster, Ch., (1975), 471.
[46] Plattes, G., *A Discovery of Subterraneall Treasure* (London, 1639), The Epistle Dedicatory, B.1.
[47] For instance when the fertilizing properties of nitre had been discovered, members of Hartlib Circle started to use nitre as a medicine for prolongation of life.
[48] Plattes, G., *A Discovery of Subterraneall Treasure*, 36-9.
[49] Plattes, G, *A Discovery of Infinite Treasure*, The Epistle Dedicatory, A3, and also p. 28: "And if men should spend their spare time in planting, graffing, and improving their land, which now they loose; judging it as good to play, as to worke for another, it would make an excellent mutation in Husbandry in an age or two, and very profitable for the generall good of the posteritie."
[50] Plattes, G., *A Description of the Famous Kingdome of Macaria*.
[51] Later included as *Mercurius Laetificans* in *Samuel Hartlib, His Legacy*, the 3rd edition, London, 1655.
[52] Plattes, G., *A Caveat for Alchymists* (1643) included in S. Hartlib's *Chymical, Medicinal and Chyrurgical addresses* (London, 1655), HP, PAM 54, 52.
[53] For Plattes' interest in geological phenomena see Debus, A.G., "Gabriel Plattes and his Chemical Theory for the Formation of the Earth's Crust", *Ambix* IX (1961):162-5.
[54] See notes 14 and 15.
[55] Fussell, G.E., *The Old English Farming Books from Fritzherbert to Tull 1523-1730* (London: Crosby Lockwood &Son, LTD., 1947), 39.
[56] Fussell mentions some farmers in the Vale of Belvoir who 40 years after Plattes published his tracts used his indication and they found it "tentious and expensive businesses, but sufficiently profitable." Fussell, G.E., "Gabriel Plattes: a XVII-Century Writer on Agriculture",

Notes and Queries 174 (1938): 78. Sir Cheney Culpeper in several letters addressed to Samuel Hartlib mentioned Plattes' inventions in setting corn, manifesting a special interest in this matter and in the way in which it was put into practice by farmers (Letter Sir Cheney Culpeper to Hartlib, 20 November, 1644, HP 13/55B; Letter Sir Cheney Culpeper to Hartlib, 4 January 1645, HP 13/59A; Letter Sir Cheney Culpeper to Hartlib, 21 January 1645, HP 13/66B). See also Webster, Ch., (1975), 482.

[57] Plattes, G., *The Profitable Intelligencer*, sig. A2r-A3v.

[58] Webster, Ch., (1975), 472.

[59] For arguments relating Plattes to the Paracelsian tradition see Debus, A.G., *The English Paracelsians*, (London, 1965).

[60] Plattes, G., *A Discovery of Infinite Treasure*, A3.

[61] Webster, Ch., (1975), 101.

[62] Harrison, P., *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press, 2007), 149.

[63] *The Great Didactic of John Amos Comenius*, trans. M.W. Keatinge (London, 1916).

[64] John Dury also emphasized the idea that education was performed under God's grace, considering the teacher involved in a divine rather than secular mission. Dury, J., *De summa curae pedagogicae seu spirituali agricultura exercitation* (1628, HP I 27).

[65] Letter Sir Cheney Culpeper to Hartlib, 28 January 1645, HP 13/69A: "For schooles the beste my thowghts can yet suggest is the hauinge in auery parishe of the Kingdome a man that in the churche showlde reade the Scriptures, &in the woorke dayes showlde teache the youthe every one accordinge to their Capacities &be answerable (to ouerseers) for thiere education of this his little cure, as the pastor id for those which are growen vp." See also Webster, Ch., (1970), 11.

[66] Webster, Ch., (1972): 36.

[67] Copy letter in scribal Hand?, Hartlib to John Winthrop the Younger, 16 March 1660, HP 7/7/2B.

[68] Harte, W., *Essays on Husbandry*, 2nd edition (London, 1770), 35, 63-4; Donaldson, J., *Agricultural Biography* (London, 1854), 20; Ferguson, J., *Bibliotheca Chemica* (Glasgow, 1906), ii, 207-8; McDonald, D., *Agricultural Writers from Sir Walter of Henley to Arthur Young, 1200-1800* (London, 1908), 78-84; Fussel, (1947), 36-44.

[69] Miles, W., "Notes on Some Early Chemistry Books Published in Pennsylvania", *Isis* 40 (1949):313-16.

[70] This line could be attributed to Hübner. Hartlib, S., *Ephemerides*, 39, HP, 30/4/18B. See also Clucas, S., (1993): 156 and Young, J.T., *Faith, Medical Alchemy and Natural Philosophy: Johann Moriaen. Reformed Intelligencer, and the Hartlib Circle* (Aldershot: Ashgate, 1998), note 58.

[71] In the 1650s Hartlib was involved in editing or publishing several books on husbandry, agricultural studies, including works on horticulture, arboriculture, sericulture and the ambitious proposal for the foundations of a College of Husbandry. Among them we can recall: Hartlib, S., *Samuel Hartlib his Legacie: or an Enlargement of the Discourse of Husbandry used in Brabant and Flandres: wherein are bequeathed to the Common-Wealth of England more Outlandish and Domestick Experiments and Secrets in refrence of Universall Husbandry* (London, 1651); 2nd edition 1653; 3rd edition 1655; [S. Hartlib], Cressey Dymock, *An Essay for Advancement of Husbandry Learning or Propositions for the Erecting College of Husbandry* (London, 1651); Hartlib, S., *A Rare and New Discovery of A Speedy way, and easie means, found out by a young Lady in England she having made full proofe thereof in May, anno 1652. For the Seeding of Silk-worms in the Woods, on the mulberry-tree-leaves in Virginia ... with two propositions tending to England's and the colonies infinite advantage* (London, 1652); Hartlib, S., *A Discoverie for Division or Setting out of Land, as to the best Form* (London, 1653);

Hartlib, S., *The Reformed Common Wealth of Bees* (London, 1655); Hartlib, S., *Chymical, Medicinal and Chyrurgical addresses* (London, 1655); Hartlib, S., *The Compleat Husband-man or, A discourse of the whole Art of Husbandry* (London, 1659).

[72] Dymock hoped to get subscription for the erection of a 'College or Society of good Husbandry', which would teach all aspects of agriculture to its students during a seven years apprenticeship period.

[73] More than this, Evelyn was also contemplating a plan for a small select community who would withdraw from society to create a paradise garden for itself and to explore the practical and spiritual possibilities of horticulture, while in the same time he intended to establish a small Baconian community of natural philosophers. For the hortulan society see Browne, IV, 275; Evelyn to Sir Thomas Browne, [28 January 1659/60]; for the community of natural philosophers see Evelyn Letters, III, 262; Evelyn to Boyle, 3 September 1659; see also Parry, G., (1992), 132; 135.

[74] Webster, Ch., (1972): 41.