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Craft knowledge and sustainability

a case study in historical cultivation methods

ABSTRACT

Historical gardens and green cultural environments maintain and transmit parts of our biocultural heritage. The gardener's maintenance and cultivation work affects both the content and our experience of these environments. While modern management methods in many cases are necessary to fulfil requirements for the work environment and efficiency, we want to investigate the extent to which alternative/traditional working methods can contribute with other qualities and with solutions for more sustainable management. Garden and Landscape Crafts bachelor's programme students at the Department of Conservation are practicing a lost craft skill by participating in a comparative cultivation experiment to gain an understanding of historical methods and their relation to the present, as well as the future development and revitalisation of sustainable historical environments.

Keywords:

craft, garden craft methods, embodied knowledge, cultivation methods.

INTRODUCTION

Historical gardens and green cultural environments maintain and transmit parts of our biocultural heritage. Conservation values can be found in the design and structure of the garden, with its pathways, hedges and various green plant areas, as well as in the historical plant material, including at the population level, the species and variety level, right down to the genetic variation (Tyler, 2019). The methods used for cultivation and management affect not only the structure of the garden and its plant material, but also the experience of it. While modern management methods in many cases are necessary to fulfil working environment and efficiency requirements, there is at the same time a risk of losing important knowledge and human experience, as well as the important characteristics of green environments, if one abandons and overlooks how craft methods have affected and are affecting the environment, vegetation, gardeners, visitors and, by extension, society as a whole (Seiler, 2020). In this paper we use

a cultivation experiment conducted by students as a starting point to explore the question, In what ways can historic garden methods contribute to the necessary transition towards a sustainable society?

In the pedagogical garden at the Department of Conservation, students in the Garden and Landscape Crafts bachelor's programme are trained in the practical application of garden crafts. Students have the opportunity to practise, manage and compare craft methods from different periods. By feeling the craft and performing it, an understanding of the work can be created (Groth, 2017).

In the pedagogical experiment described here, students are asked to compare modern small-scale plant raising in greenhouses with historical plant raising in hotbeds and cold frames. The comparative work is not just a student exercise in setting up and reporting the measurable results of an experiment, but a part of deepening the students' understanding of the importance of craft methods and the embodied knowledge of the gardener, as discussed by Westerlund (2022). The purpose of the experiment is not only to compare two methods but also to investigate what thoughts and reflections the practice of a historical working method evokes in the craft students. It is an exercise in which we want to link the students' insights from the experience of the craft exercise to a discussion about the role of traditional horticultural practices in society today. Together with the students, we examine the possibilities and difficulties involved in the different working methods for plant raising and consider the parameter of sustainability when comparing labour input and plant development between the methods. In the long term, the aim is to develop educational material that can be used as a basis for discussion concerning more sustainable management.

Understanding the gardener's knowledge

The continuity of the intangible cultural heritage that has been handed down from generation to generation in the form of traditions, knowledge and craftsmanship has long been broken when it comes to hot beds and cold frames. Today, no professionals use these to produce plants.

Craft science research on garden crafts is young. Examples of transmitted and embodied craft knowledge have been captured. In her research, Westerlund (2017), for example, had the opportunity to see and work together with several gardeners still practicing the small-scale professional propagation of perennials. Seiler's (2020) research on the historical management of the garden's grass using scythes, rollers and brushes shows a broken continuity that is similar to that of hotbeds and cold frames. In his thesis, Seiler (2020) describes his method for understanding historical management: how he moves back and forth between the historical sources and his practical experiments and thus gradually builds up a new understanding. Emmanuelsson (2023) wants to combine three methods to better understand older landscapes: studying written and oral sources, seeking out places where older land use methods are still in use and documenting them, and testing farming methods in practice (Emmanuelsson, 2023).

Within the framework of a student course, we try to expand the knowledge of older working methods in plant production by practising them again. We use descriptions from the gardening manuals as a starting point for the practical execution; in the process, we are faced with new questions that need to be reconciled with older sources. One area where the department has developed a certain understanding and knowledge of historical methods is in the production of soil mixtures for planting. Since 2018, one of the authors of this paper has been experimenting with the production of planting soil based on recipes or working methods from historical sources (Sjöberg, 2018). As a result, a variety of composts with different properties has been built up over the past five years in the department's garden (Vea, 2022). These composts, as well as the experience of raising plants in their own soil mixtures, have been used in the comparative cultivation experiment described here.

The gardener's skills

The gardener's skills are based on personal knowledge and practical experience developed through the interaction between people, places and materials. The gardener of the past was to a greater extent than today anchored in local resources and was involved in managing entire processes, from, for example, substrate production to sowing and plant raising to ready-to-plant seedlings. This is in contrast to modern gardening, where different steps in the process are divided between specialised actors (Olausson, 2014). Students' use of historical cultivation methods can provide new perspectives on

historical versus modern small-scale practice. Documentation of the work process enables further evaluation of the possibilities and challenges of traditional methods and their development in relation to sustainability and cultural and social values. By raising plants in hot beds and cold frames, we also want to, for the students, emphasise the importance of the gardener's emplaced as well as 'embodied knowledge' (Bentz Høgseth & Rannved Rafnsson, 2022). It was primarily with the help of all their senses that they could control the climate and the conditions for cultivation. It was also of great importance to be attentively present in the cultivation and to be aware of all weather conditions, such as precipitation, solar radiation and the direction of the wind.

Traditional hot bed and cold frame cultivation

In the middle of the 20th century, frame cultivation was abandoned in favour of cultivation in greenhouses. One of the reasons for its disappearance is that frame cultivation maintenance was labour intensive, and it became economically unsustainable as the cost of labour increased. In addition, the availability of horse manure, which was the main source of heat, declined as machinery took over in the 20th century and new greenhouse technology opened up other possibilities.

Hot beds and cold frames for outdoor cultivation have been used in Sweden since at least the 17th century. They were used primarily for raising seedlings, but also for growing and harvesting heat-demanding plants such as cucumbers and melons. Frame gardens consisted of wooden frames on top of which glass windows were placed. Several frames together were called a frame yard. A cold bench was heated by the sun's rays, while a hot bed was heated from below using decaying organic material, and in later times with electrically heated water pipes (Olausson, 2014).

Commercial gardens, as described in historical garden handbooks, could have hundreds of frames, both cold and hot. The hot beds were filled with organic material that would begin to decompose and give off heat. There was constant supervision and maintenance. They would be covered with reedmats in the evening to protect against frost and retain heat, and removed each morning when the sun began to warm the beds. The frame should not be too hot, or too humid, and this was controlled by manually opening the windows according to the weather. When watering, the windows were held with one hand while watering with full zinc watering cans. For maintenance, such as cleaning and retraining, the windows were lifted off and boards were laid over the bench where the workers knelt and bent over the frame to work. So why subject our students to this heavy and arduous work?

The students' cultivation experiment

The cultivation experiment was carried out for the first time in spring 2023 by second year students. During the first year of their studies, they had followed a whole growing season in the university garden and, together with teachers and gardeners, were responsible for the crops. They brought with them a year's experience of growing, from sowing to harvesting, as well as studying and working with soil mixtures and composting.

The student experiment itself is a pre-study to find out how a practical exercise in traditional crafts in higher education can both deepen students' craft skills and increase their understanding of traditional horticultural practices. Students have been asked to try out and take responsibility for a demanding historical method of plant raising with the aim that the student will:

- Get to know the gardener's materials (soil, plants, conditions for planting)
- Experience and practice the kind of attention and presence required by a gardener to gain a deeper understanding of concepts such as the 'embodied knowledge' of horticultural crafts
- Understand and be able to reflect on the possibilities and difficulties in relation to modern methods
- Gain understanding and insight into the past working methods of the gardening profession and
- Reflect on sustainability issues and care for cultural values.

In the experiment, a total of 600 plants of tagetes, *Tagetes patula*, were raised using two different cultivation methods: a modern method and an older one based on techniques used in the early 1900s.

It should be emphasised here that the aim was not to make a completely correct reconstruction of a historical plant raising, but to test a historical method in our modern context; that is, local materials were used, while plastic products and electric heating were avoided. The modern plant production was done in a heated automatic greenhouse, in purchased peat-based potting soil, and the plants were trained in plastic pots (see figure 1).



FIGURE 1. Newly trained seedlings in plastic pots in greenhouse. Image by the authors.

The other half of the plants were raised outdoors in a hot bench covered with glass windows, in soil mixes made from our own composts (garden compost, leaf mould and manure). The plants were trained in a cold frame and planted out in the open air with a clod of soil (see Figure 2 and 3).



FIGURE 2. Newly trained seedlings in cold frame. Image by the authors.



FIGURE 3. Plant raised with traditional methods without using plastic pots. Image by the authors.

Students were asked to document, compare and reflect on the differences between the methods (see Figure 4).

Factor	Greenhouse	Bench
<i>Heating</i>	District heating	Organic material
<i>Climate control</i>	Automatic	Manual
<i>Sowing in</i>	Plastic pots	Wooden boxes and frames
<i>Soil / Substrate</i>	Purchased peat-based	Own soil mixture
<i>Ergonomics</i>	Healthy working position	Heavy, sometimes unergonomic
<i>Watering</i>	Water hose	Zinc watering can

FIGURE 4. Factors that differ between our plant raising in the greenhouse and in the bench.

For the students, it was a long experiment that lasted two months and required continuous supervision. The final destination of the plants was an ornamental planting at the Marieholm residence in the centre of Mariestad, which increased their sense of responsibility. For the teachers, the experiment will continue even longer, as we will follow the development of the plants after transplanting to discover possible differences between those grown in the greenhouse and those grown in the frames.

Reflections on the cultivation experiment

Carrying out a horticultural craft project in higher education has its difficulties. The intensive care of the plants needs to be fitted into a course that contain parallel content, as well as start and end dates that may not coincide with the development of the plants. Due to parallel content in the course the students sometimes had to hand over care responsibilities to other students. This may have affected the students' relationship with the experiment. The task places high demands on the students' commitment, sense of responsibility and regular attendance as they need to check the temperature several times a day and carry out activities such as irrigation, aeration and covering of the greenhouses. The climate in a windowed frame is quickly affected by weather conditions, making it very likely that the temperature will be too high or too low for the plants. The ability to perceive, read and interpret all relevant factors is crucial in order to implement the right management measures at the right time. In addition, the student group needs to have a good capacity to co-operate and communicate as they take turns to manage the experiment.

The students faced a lot of challenges during the trial. The spring was unusually cold and the hot bed did not rise in temperature as expected, which resulted in such low germination in the first sowing in the bench that a resowing in wooden boxes had to be done. This setback created some disappointment and resignation in the student group. Despite the problems, the plants were ready for transplanting in the first week of June when the experiment was completed for the students.

The students' own reflections on the historical methods in the experiment concerned not only easily comparable parameters such as temperature, plant quality, labour time and ergonomics, but also inherent differences in the work itself. The students noted that frame cultivation required more foresight, planning and hard physical labour, that the need for control and timing was greater, and that the historical method involved closer contact with the site and the surrounding environment, where the direction of the wind and the soil, as well as changes in the weather, became important to keep track of and adapt the care to. It became very clear that the historical gardener's work did not follow office hours but often involved working early mornings and late evenings. It also involved some level of stress, as the consequences of a missed aeration could result in the death of the plants. The students also reflected on the fact that the materials used for frame cultivation were more local and sustainable, such as the soil being made from their own composts, sowing in wooden boxes and the energy supplied not being of fossil origin but coming from the heat-generating decomposition of organic matter, the sun and from the physical labour of the gardener. The students felt that parts of the historical working meth-

od would be interesting for a home grower to use, but that the labour input and the heavy work in the bench were so much greater that it was difficult to justify when more easy-to-maintain and cheap maintenance alternatives are available. However, the importance of the methods being used and demonstrated somewhere was also emphasised. The sustainability benefits noted by the students were the reduced use of plastic and energy for heating, the use of local materials for soil production and the resulting reduction in transport. Several students also described an interest in learning more about frame cultivation as a result of participating in the experiment.

DISCUSSION

In combination with modern methods, traditional crafts can contribute to richer cultural-historical experiences, and traditional knowledge and methods are also increasingly described as a valuable part of sustainable development in a broader perspective (IAASTD, 2009; Tunon, 2021). In their work to manage, preserve and animate our cultural history, professionals in green cultural heritage environments balance historical authenticity, efficiency, quality, existing resources and sustainability. By practising historical methods they contribute to sustainable development in several ways.

Gardeners preserve and develop an understanding of history and can in their practice explore the potential for sustainability in methods, materials and environments. The future will need a variety of solutions at different scales to meet the challenges of a changing climate and limited resources, and the gardener can be a part of this.

Being public spaces, historic gardens have the potential to contribute to a richer cultural and historical experience for the visitor; they also have great potential to act as a showcase of knowledge and a channel for disseminating knowledge of sustainable practices to visitors. By extension, the question is, Can a gardener's work with traditional craft methods also influence visitors' relationship to the site and thus their attitude and care for it? Kimmerer (2013) writes about the need to 'restore' people's relationship with nature while restoring green environments. She argues that humans need to strengthen their relationship with place and draws a parallel with the reciprocity that characterises many indigenous peoples' relationship with nature. Leopold (1949) argues that people's sense of respect and care for nature is based on a close relationship with it, and uses the concept of 'land ethics'. In the garden, human contact with the place, its soil, plants and animals, is close and tangible. In traditional horticultural practices, the interaction between man and garden is characterised by interdependence (Tunón, 2021). Might the practice of traditional methods be a human experience that can help bring people closer to nature and increase their desire to care for it?

There are many explanations for the disappearance of historical gardening methods and their replacement by modern alternatives, and there is reason to avoid romanticising the often heavy and arduous work of the gardener of the past. At a time when sustainable solutions need to be sought in all areas to deal with the acute climatic and environmental challenges facing humanity, professionals in cultural-historical green environments should also analyse their opportunities to contribute. Modern horticultural crafts methods have developed in an era of cheap energy and dependency on fossil fuels. Traditional horticultural practices are more labour-, time- and knowledge-intensive but in return are based on the use of more local materials and are less dependent on external inputs. At the same time they carry the potential to improve the human-nature relationship. The students' reflections after the experiment suggest that the practical craft experience stimulated a sense of connectedness to place, as well as an increased understanding of the embodied quality of traditional knowledge. We therefore see potential in the continued development of similar pedagogical experiments for future students in garden craft. As one student put it: 'It was difficult and demanding to cultivate in the historical way but also rewarding, fun and *beautiful in a different way* than the modern.'

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