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**From Starving Time to Abundance: How Technology Could  
Have Enhanced the Food Supply at Jamestown**

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## **From Starving Time to Abundance: How Technology Could Have Enhanced the Food Supply at Jamestown**

Gold. That is what the 105 blacksmiths, carpenters and gentlemen hoped to find in 1606 when they set sail from England to the uncharted land that was to become Jamestown, the roots of America. They could establish a settlement or find a water passage to the Orient, but, most importantly, the colonists could provide a good return on investment for the Virginia Company of London. Much has changed in America in the 400 years since the *Susan Constant*, *Godspeed* and the *Discovery* arrived on the shores of Jamestown Island, with Christopher Newport as captain. One cannot help to wonder how the knowledge and modern technology we have today in 2007, might have made life easier for the colonists.

Imagine spending five months at sea cramped in small sailing ships with meager food and drink. No doubt Jamestown Island looked like a great location to the settlers when they arrived in May, 1607. It was springtime and everything was lush and green. They arrived at planting time, but planting food suddenly became a lower priority when the colonists were periodically attacked by native Powhatan Indians. They quickly began building a triangular fort with walls of 800 pound logs. The men grew sick, weak and miserable from the amount of work they had to do under the hot Virginia sun. They were not used to such heat, and their food and water supply was inadequate to provide them with the energy they needed to work so hard. In an account about the conditions in Jamestown written by Lieutenant Governor Percy, he says, "Our men were destroyed

by cruel diseases as swellings, fluxs, burning fever and by wars, but for the most part, they died of mere famine”. After three weeks, the fort was completed. The colonists were secure inside its palisade walls, but, where were they going to get food and water to keep themselves alive?

When they were able to, the Jamestown colonists traded copper, beads and weapons with the Powhatan Indians for food. Unfortunately, there were a series of misunderstandings with the Powhatan chief, Wahunsonacock. Food shortages became a serious issue and the winter of 1609 was especially rough on the colonists. It was called the “Starving Time” because the colonists three main ways of getting food were cut off. The cold temperatures and winter weather made it impossible to grow crops, the supply ship from England had not arrived, and the peace between the Indians and the Englishmen had vanished, thus trapping them inside the Jamestown fort. Only 59 of the original 500 settlers survived the Starving Time. Life in Jamestown was hard, and lack of proper nutrition was a major problem 400 years ago.

What if we could take what we know today and use it in 1607 Jamestown? The colonists desperately needed a way to find or grow their own food within the safety of the Jamestown fort. Today we have an understanding of nutritional requirements that the settlers did not have. Designing and building a self-contained space for growing the fruits and vegetables essential for a healthy diet could have sustained the colony longer and prevented many deaths from starvation, scurvy and other diseases. The design and construction of a greenhouse using 2007 technology and knowledge, where plants are cultivated hydroponically would have greatly improved the lives of the colonists.

However, experimentation had not even begun on hydroponics in the 1600's, so the colonists had no idea about the concept of growing plants without soil.

Greenhouses trap solar radiation inside to warm the plants and soil. They work by preventing convection, or the transfer of heat from one place to another by the movement of heated particles. Protecting crops from too much heat or cold makes greenhouses very important in places where plants normally can't grow all year round. Greenhouses are usually pollinated by bumblebees, which can easily be found in Jamestown.

In hydroponic greenhouses, sand or water is used as the material in which to grow plants. In aggregate culture hydroponics, plants are placed in either sand or gravel and water, and a nutrient mix is continually added along with oxygen. Modern-day technology tells us that six natural nutrients are necessary for good plant growth. They are nitrogen, sulfur, phosphorus, calcium, potassium and magnesium. Had the colonists known this, they could have located them in the Jamestown area. Oxygen and nutrients could be added to the sand and desalinated water substance by using simple bellows to pump it in.

A large greenhouse could be constructed of a brick foundation with panes of glass. There was plenty of clay and sand for mortar near the fort. Glass panes were made of sand and oyster shells and could be heated in a large oven, then blown or formed as needed. In a display at the Archaearium, a visitor center at Historic Jamestown, it documents that in September, 1608, three German glassmakers arrived and, at some point, a Glasshouse was built where glass windows were manufactured. Certainly

the raw materials such as sand and oyster shells were abundant to the colonists. There was also plenty of timber to fuel the extremely hot ovens required for glass making and shaping.

Plants grown in the greenhouse could include citrus fruit, a great source of Vitamin C that today we know prevents scurvy. 2007 nutritional research also tells us that spinach, carrots, peaches and berries tend to be higher in vitamins and minerals than other fruits and vegetables, so they would be good additions. Also, tomatoes could be grown hydroponically in the greenhouse. Tomatoes contain antioxidants which are widely used today as ingredients in dietary supplements in hopes of maintaining health and preventing diseases such as cancer and coronary heart disease. Surely the colonists would have not only greatly enjoyed fresh fruits and vegetables, but had they known of their many benefits, they might have considered building a greenhouse back in 1607.

Johannes Fleischer, a Botanist who arrived in Jamestown in May, 1607, could have been the caretaker of the greenhouse. If he would have known about hydroponics, he could have brought seedling plants with him from England and transplanted them into a mix of sand and water in the greenhouse. He could have added the necessary nutrients to make the plants grow quickly and keep them healthy so they would produce good crops.

A hydroponic greenhouse built inside the fort walls at Jamestown could have been the answer to a scarce food supply that could not be counted on. No longer would the colonists have to be dependent on the Powhatans as a food supplier. No longer would they have to suffer from diseases caused by a poor diet. No longer would they starve in

the winter when most regular crops could not grow. A hydroponic greenhouse would have made life much easier by providing a healthy, year-round food supply and could be built using raw materials available at Jamestown Island. Knowledge of the nutrition, botany and building technology of 2007 tells us that a healthy diet would have prevented many deaths in Jamestown. The construction of a workable greenhouse using hydroponics could have been a reality in the Jamestown of 1607, with the technology and knowledge we have 400 years later.