compensation point. The concept of pyramids of biomass which may be supported during steady state suggests a reason. Whenever food energy is passed through an energy transformation step, a large percent, perhaps 90%, must go into heat as required by the second law of thermodynamics for these types of reactions under optimum efficiency—maximum power adjustments.

If a plant in the day can drive some of its work systems directly rather than making glucose first and then burning the glucose, the plant can save a step and thus avoid the heat loss from the extra step. Thus a higher efficiency in the heterotrophic system is maintained with less respiration. At night, by this view, it becomes necessary for the plant to fall back on glucose stored thus lengthening the chain of transformations and requiring increased respiration.

If true, this becomes especially significant when length of day and night is considered, for a little difference in day length means increased efficiency as well as additional light. There is less glucose that must be stored for use at the inefficient night rate. By this view Arctic plants during continuous daylight of summer should be much more efficient than similar temperate plants. On an annual basis however there would be no gain for the community would have to store many months worth of organic matter at the inefficient night rate.

F. Anaerobic Springs and the Saprobe System

The saprobe system of classifying pollution communities assumes the association of characteristic indicator species for different degrees of sewage type pollution. A consideration of Florida anaerobic springs shows that the system while useful when properly used has a fallacy that leads to misleading conclusions when used on waters in general.

Beecher, Orange, Warm S. M., and Volusia Co. Blue Spring are all examples of large springs with low organic content water that is also low in oxygen. The communities that result are both anaerobic and autotrophic in nature. In contrast sewage communities are anaerobic and heterotrophic. In the springs one gets sulfur bacteria and blue green algae but no ciliates. In short one gets some of the saprobe system biota in water that is the extreme opposite of sewage polluted water. Thoughtless use of the saprobe system leads to a complete misclassification of the type of primary production in these cases.

G. Some Definitions, Suggested methodology

In agriculture, man's continued labor and supervision guise a complex community in a direction he desires. However in Ecological Engineering the outcome of production of a complex community is achieved by proper selection of components at the start with subsequent hands off thus permitting the community to reach a unique steady state adjustment.

In the usual scientific experiment, man controls one variable so as to study the behavior of another dependent variable while holding other conditions constant. Thus the process is one of analyzing component processes. In Microcosm experimentation on the other hand components are put together and the complex allowed to make its own trends under observation.

The study of ecological engineering by microcosm experimentation is a practical methodology for studying the synthesis of ecological systems. This springs project is an example of the microcosm approach.