soil is not available, a good substitute can be made by mixing grass sod and stable manure and turning the mixture, at intervals, until the whole mass has completely decayed.

Where efficient means of sterilizing the soil are employed the soil used in growing the seedlings should be changed every two or three years; however, if the soil is not sterilized it should be changed every year to prevent the bed becoming diseased.

Types of bed.—An ideal type of bed for producing early seedlings is one within a greenhouse. However, there are other types of bed which are almost as satisfactory for growing early seedlings and less expensive. The ordinary cold bed, in which the soil is merely well pulverized and covered with glass, is fairly satisfactory. A still more satisfactory type of bed, from the standpoint of earliness, is the glass-covered, semi-hot bed. This is made by first digging out a trench about eight inches deep and any width desired; the trench is then filled with straw or cornstalks to a depth of about six inches, after which about five inches of soil is placed on the straw or stalks and the whole well packed. The bed is then ready for sterilization, after which it may be seeded.

The results of three years' experiments have shown the glass-covered semi-hot bed to be vastly superior to the glass-covered cold bed for producing early plants; in every instance the semi-hot bed, which was steamed and seeded at the same time and with seed of the same variety of tobacco as the cold bed, produced plants ready for setting out four to five days earlier than the cold bed and in some instances eight days earlier. Even when covered with canvas, the semi-hot bed is superior to the canvas-covered cold bed, other conditions being the same.

The advantage of the semi-hot bed lies in its ability to retain its heat longer; the layer of straw breaks the conduction of heat from the top of the bed to the lower layers of soil and, as a result, the temperature of the semi-hot bed is lowered much more slowly than that of the cold bed and generally remains one or two degrees higher over night than that of the latter.

Sterilizing the Seed Bed.—After the bed has been made it should be thoroughly sterilized before seeding. The prevalence of diseases of tobacco, such as root rot (*Thielavia Basicola*) and bed rot or damping off of the plants, necessitate this treatment. Sterilization has been found to be the most effective means of controlling these diseases in the bed; the operation may be performed in a number of ways; namely, by burning the soil, by steaming the soil, or by treating the soil with chemicals. Of these methods, the first two are most satisfactory, as not only are the disease germs killed by burning or steaming but the weed seeds as well; while with the chemical treatment very few, if any, weed seeds are killed and beds so treated must be weeded several times before the seedlings are large enough for transplanting. Often the beds can be steamed for what it costs to weed them once.

If the bed is to be sterilized by burning, it should be burnt in sections; each section having a hot fire burning on it for about thirty minutes.

Under most conditions, sterilization by steam will be found most convenient. A galvanized iron pan 12 feet long, 6 feet wide, and 6 inches deep is inverted over the bed, the soil of which has been well loosened and pulverized, and after connecting the pan with a boiler the steam is turned on for thirty minutes. To be most effective the steam in the boiler should be under not less than 100 pounds pressure; for at the higher pressures the steam is drier and more penetrating. As long a time as possible should elapse after steaming before seeding, as the high temperature to which the soil is raised during the steaming process renders conditions in the soil abnormal; and the young seedlings will not make a thrifty growth under such conditions.

Cold beds steamed in the fall, and well covered to prevent the wind blowing in weed seed and unsterilized soil, are just as satisfactory as spring-steamed cold beds. However, with semi-hot beds the results might not be quite so satisfactory, as they would have a tendency to settle too much during the winter and the layer of straw would lose some of its effectiveness as an insulating medium.