the trees lost vigor. We cut out our shelter belts and looked for a suitable replacement. We have replaced these with *Populus flevo* and *Salix matsudana*.

Our potting shed was built in 1970 with 4 ft. concrete walls with a timber frame of 10 ft. x 26 ft. x 32 ft. All daily work is carried out in the potting shed and for soil storage and tractor storage we built a 45 x 38 ft. cyclone truss shed. This enables us to work 12 months of the year. Even with 6 months continuous rain, we always had dry soil.

For weed control the gravel pad is sprayed with Paraquat and Simazine for long-term weed control, using Roundup for any hard to kill weeds. For containers we use Simazine or Ronstar but not as an overall spray. We use a hand dosing gun with a spray tank containing Paraquat and Simazine or Ronstar. Tractor spraying is used around the base of trees or shrubs having mature stems only. A paint brush dipped in Roundup and Ronstar, wiped over the foliage of the weeds, is very effective, and is quicker than hand weedings.

POLYTHENE VS. ALUMINIUM FOIL FOR KEEPING PLANT MATERIAL FRESH AND HEALTHY

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Transparent and opaque polythene bags are extensively used by nurserymen and plant propagators We put cutting material in them to keep them fresh, we store seeds and we even sell trees and shrubs nicely packaged in lovely polythene display packages. We also use them for a dozen and one other purposes and take it for granted they are doing the job well. Polythene bags are clean, cheap, don't go soggy, are reasonably tough, and competitively priced. About the only shortcoming transparent and opaque polythene bags have is that they don't do what they are supposed to do, i.e. keep plant material fresh and healthy. In fact, it is hard to find any container more useless for the storage of live plant material. Cutting material collapses, seeds lose viability, flowers wilt, fruit rots, and it all happens better and quicker in polythene bags. Waxed paper, waxed cardboard, wooden boxes, damp sacking, damp cotton, and even tin cans are all superior to polythene for the purpose of keeping plant material alive and healthy.

On the other hand, aluminium foil is the material which far outshines all others with regard to keeping plant material fresh during storage. In any comparison between these two materials, it is important to understand their diverse physical properties Polythene is excellent for admitting light which will pass through a thin, clear polythene bag with little impedence. Aluminium foil, on the other hand, is extremely inefficient at admitting light — in fact, all light is reflected off its shining surface. Polythene is very inefficient at conducting heat and, therefore, is a reasonably good insulator. A 1 cm. thick sheet of polythene can be melting on one side and be cold on the other. Aluminium foil is very efficient at conducting heat. A 1 cm. thick sheet of aluminium foil will be the same temperature on both sides very quickly.

These diverse physical properties are the basis for the huge difference in the performance of these two substances as a packaging material. Polythene bags admit short wave energy in the form of radiation and light. This energy is converted into long wave heat upon striking the substances contained within the bag. This heat is retained within the bag by the insulating properties of polythene, which is actually operating as an efficient little solar heater. Aluminium foil, on the other hand, so efficiently reflects nearly all the short waves striking its surface, that there is no heat build-up either inside the bag or on its outer surface.

Furthermore, as aluminium foil is an excellent conductor of heat, should any long wave heat build up, it is readily conducted evenly through the foil and rapidly lost. Therefore, it is much cooler inside the bag under the same energy conditions as the polythene bag. This can be readily demonstrated by placing a thermometer inside both the polythene and aluminium foil bags. These thermometers should have a piece of black polythene wrapped tightly around the bulb and held in place by a rubber band. These bags should then be sealed around the top of the thermometer with a second rubber band, to trap the air inside. The thermometers should be so arranged as to not touch the sides of the bag, and be so placed that the temperature can be read without removing them from the bags. A third thermometer is required to take the temperature outside the bags. Temperatures under different situations are shown in Table 1.

The temperature readings were mostly made on a cool, cloudy day, with a light to moderate wind blowing. The recording taken in the sunny automobile seat shows the folly of collecting propagating material in a polythene bag, and then tossing it on to the seat of the car, as many have done from time to time. The temperature of 60.25°C. exceeds that recorded in most of the world's hottest deserts. Temperatures of that magnitude are no place to store plant material. In only one instance did the polythene bag temperature show a cooler

Table 1. Temperature comparisons between polythene and aluminium foil bags

Location of bags	Air Temp °C	Foil Bag Temp °C	Poly Bag Temp °C
Storage shed with little lighting	17 25	17 00	18 00
Automobile back seat — dull and cloudy day	23 50	23 25	25 00
Automobile front seat — dull and cloudy day	22 50	22 50	24 00
Dwelling house room with electric lights on at night	17 00	17 00	17 25
Dwelling house room, dark at night	19 50	19 50	19 50
Domestic refrigerator	3 00	4 25	4 00
Windowsill — bright and cloudy	20 50	20 50	25 75
Windowsill — dull and cloudy	18 75	18 75	20 75
Shaded horticultural glasshouse — bright and cloudy	19 50	20 00	28 00
Shaded horticultural glasshouse — dull and cloudy	16 25	16 50	19 25
Bright sunlight on grassy lawn — cool and windy day	21 00	22 00	42 00
Wire netting frame — dull, cloudy, windy day	17 00	17 00	22 00
Automobile seat — bright, hot sun	32 00	30 00	60 25

reading than the aluminium foil. This recording was taken in a domestic refrigerator, and the explanation for this difference is probably because our refrigerator temperature fluctuates from between 2°C. and 5°C. with its thermostatic control — a truly accurate reading would be impossible under such fluctuating conditions

These figures also explain why polythene bags sweat. Any substances contained within them are maintained at a higher temperature than the air outside the bag. Therefore, water vapour that is given off is condensed on the bag's surface, which is being cooled by the outside air.

Aluminium foil has the disadvantage that it is not a very good material with which to make bags, as it rips and tears easily. We are now using foil paper laminate bags in the nursery, designed primarily for the purpose of roasting chickens. While they are the best available at the moment, they are still not strong enough. When damp they tear very easily, because the paper reinforcing goes soggy. Any bag of the future, I feel, should be a laminate of two layers of very thin aluminium foil, with a strong flexible substance sandwiched in between. This could be a synthetic meshing, or even a very thin layer of polythene might be satisfactory. However, it must be strong and flexible. We made some bags from reinforced foil building insulation paper. These proved very good at keeping plant material fresh, but were too stiff and unmanageable to be universally useful

In conclusion, I would like to say that, after a number of years of experiencing all sorts of problems with keeping plant material fresh and healthy in polythene bags, I have found aluminium foil to be demonstratively better under most circumstances. Its only fault is a lack of physical strength. I see no reason why foil laminate bags and boxes cannot be manufactured, with a consequent improvement in the keeping quality of any substances contained within. I would recommend their use in preference to polythene.