

# Apple Scientists Study Temperature Changes

Apples expand and contract like most materials when subjected to warming or cooling temperatures. However, recent experiments find that the initial effect of warmer or cooler conditions has been the reverse of that expected, according to Dr.

Loren D. Tukey of The Pennsylvania State University. Upon exposure to warm temperatures, cold apples at Penn State contracted for about 3 hours before expanding. Warm apples, when cooled, initially expanded for about 30 minutes

before contracting. Dr. Tukey announced the findings August 29 at the 69th annual meeting of the American Society for Horticultural Science in St. Paul, Minn.

This unusual response appears to be due to the transfer of moisture within the intercellular spaces from the outer areas of the apple to the central area under warming conditions. The reverse occurs under cooling conditions, Dr. Tukey said.

In the heat transfer process, changes occur in the vapor pressure of the moisture and a gradient develops. Moisture at a high vapor pressure moves to that at a low vapor pressure. With an inward mass transfer of moisture, the effect would be contraction. Outward movement would create expansion. The amount of change in fruit size is small, less than one millimeter for a 3 inch apple.

This effect of heating and cooling on moisture transfer is a new phenomenon for fleshy biological materials. In addition to apples, effects of a heat and mass transfer have been ob-

served in pears, oranges, cucumber, potatoes, and apple wood.

The effect has been verified by cooling the core area of an apple at room temperature to establish a temperature and vapor pressure gradient. Fruits contracted as expected.

The research is part of a series of investigations at Penn State to determine the handling characteristics of fruits, especially in relation to bruising.

Previously, cold apples were found to bruise easier than warm apples.

Still unknown is the significance of these findings on lateral moisture movement in plants, on the rate of respiration, and on the length of life of stored fruits. However, fluctuating refrigerator temperatures are less effective than constant temperatures for the storage of apples.

## HUD, USDA Team Up for Rural Planning

A report issued jointly by the U.S. Department of Agriculture and the U.S. Department of Housing and Urban Development points to a sharp increase in fiscal year (FY) 1972 over previous years in assistance from both for comprehensive rural development planning by local multicounty organizations.

HUD provided \$7.7 million for 260 nonmetropolitan planning districts in FY 1972 compared with \$3.4 million for 155 districts in the preceding year, according to the report, submitted to Congress today.

USDA field staffs also increased by 25 percent their technical services for land use planning, housing studies, community facilities planning, citizen participation, and other elements of district planning programs. The Department contributed approximately 316 man-years of such services in FY 1972.

"In cooperation with the Federal Government, the States are now actively seeking better methods to improve planning and management at the local government level and to insure that planning will influence government decisionmaking and area development initiatives," Secretary of Agriculture Earl L. Butz and Secretary of Housing and Urban Development George

W. Romney said in sending the report to Congress.

The Housing and Urban Development Act of 1968 authorized USDA and HUD assistance to States for support of nonmetropolitan district planning programs. The Agricultural Act of 1970 requires an annual report on this activity, as well as other USDA and Federal services and programs for rural areas.

## In the Kitchen

### CUCUMBER TOPS

- 1 (4-1/2 oz.) can chicken spread
- 1/4 cup chopped walnuts
- 1 tbsp. apricot preserve
- 1 tbsp. sour cream
- 10 slices whole wheat bread
- 20 thin cucumber slices for garnish

Mix together first four ingredients for filling and spread over five slices of bread. Cover with remaining slices. Trim off crusts and cut sandwiches diagonally into four triangles. Stand these on their bases and decorate points with twisted cucumber slices. Makes 20 sandwiches.

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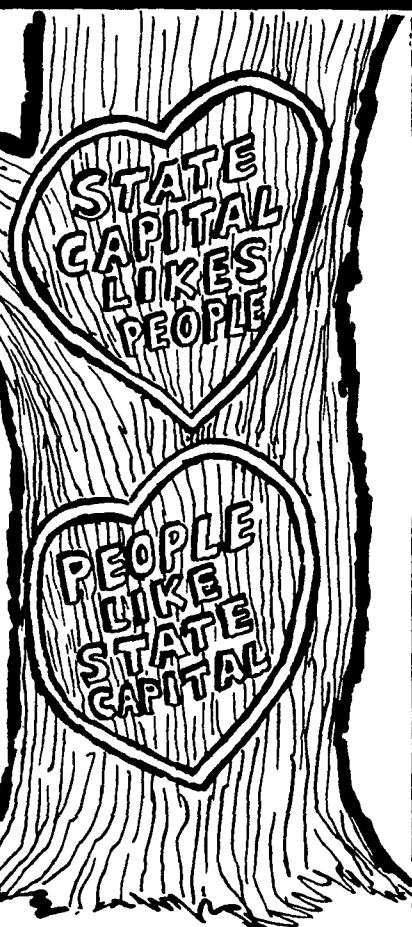
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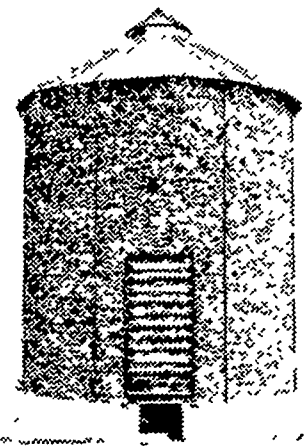
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