

# Ethylene Oxide—A Possible Breakthrough For Increasing Longevity Of Cut Flowers

BY SAM ASEN<sup>1</sup> AND MORRIS LIEBERMAN<sup>2</sup>

Enhancing the longevity of cut flowers has long been one of the aims of the florist industry. Much attention has been given to the many environmental factors which influence keeping quality and practices have been recommended at the grower, wholesaler and retailer levels. These recommended practices have had some beneficial effects but there is still much room for improvement. This report describes research that gives promise of improving some of these practices.

**Ethylene and Ethylene Oxide**  
The formation of ethylene has been associated with senescent metabolism. The findings of Lieberman and Mapson (1) in 1962 that ethylene oxide inhibited ethylene production and ripening of intact fruit was a very significant discovery. These investigators, in a number of experiments, retarded the ripening of green tomato fruits by holding them for 16 to 22 hours in an atmosphere containing 0.75 percent ethylene oxide. The treated fruit then ripened normally at 68°F after a delay of 5 to 21 days, depending on the ripeness of the fruit at the start of the experiment.

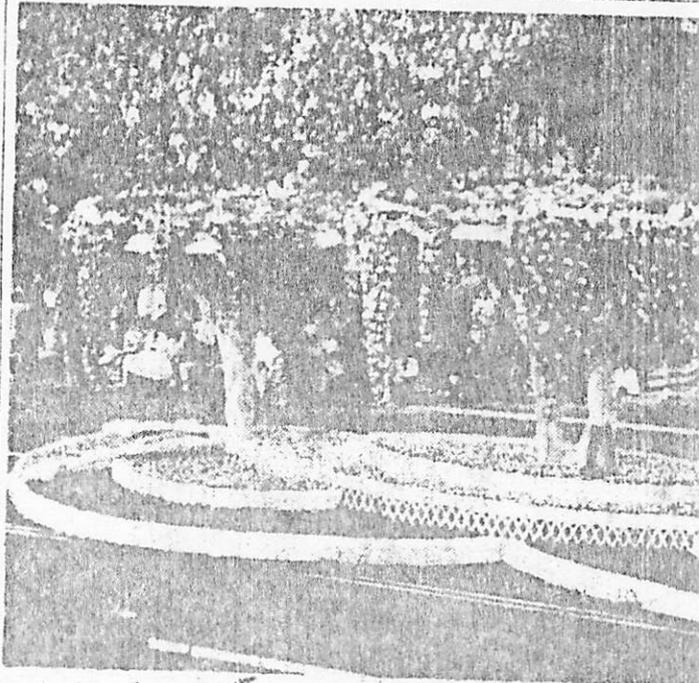
Freshly cut Better Times roses were held for 20 hours at 60°F in an atmosphere containing 0.25 percent ethylene oxide. After treatment the roses were removed from the chambers, the chambers flushed daily with water, and the roses returned to the sealed chambers for 2 additional days at 60°F. Keeping the roses in sealed chambers for 2 additional days made the initial treatment more effective. Measurement of ethylene oxide by gas chromatographic procedures indicated that after the initial 20-hour treatment the roses emitted the gas for approximately 3 days. The emitted gas presumably was responsible for the added effects of the 2 additional days in the chambers. After the 2 additional days at 60°F the roses were removed from the chambers and placed at

70°F for evaluation. The roses were evaluated on the basis of the degree of opening since this phenomenon is associated with maturation. Values of 1 through 8 assigned to roses of various stages of maturity are shown in Figure 1.

The effect of the treatment on longevity is shown in Figure 2. After 40 hours at 70°F the untreated roses were completely open, whereas those roses that were treated did not completely open until 70 hours. The appearance of the untreated and treated roses after 40 hours at 70°F is shown in Figure 3. It is quite evident that this ethylene oxide treatment effectively delayed the rate of maturation of the Better Times roses without injury. The treatment was just as effective with Briarcliff and almost as effective with Golden Scepter and White Butterfly roses.<sup>3</sup> Other beneficial side effects from the treatment were better color and a longer retention of the petals once the flowers were completely opened. Concentrations of ethylene oxide above 0.3 percent were injurious. The buds turned brown and failed to open. At this writing, roses have been the only cut flower tested but many other cut flowers will be included in future trials.

Although the results of treating roses with ethylene oxide have looked promising in several experiments we must caution that this is still preliminary research. Many problems lie in the way before practical consideration can be given to the use of ethylene oxide for delaying the maturity and increasing the keeping quality of cut flowers. For example, time and rate studies for the best application must be resolved for each variety of cut flower studied. An engineering problem will

(Continued on page 4)



Twenty five thousand roses and ten thousand orchids were used to decorate FTD's grand prize winner entry in the Tournament of Roses parade in Pasadena on New Year's Day. Miss Connie

Henny, Martin rode on of Happ

## FTD Entry Captures Top Parade Award

DETROIT, Mich. — Florists' Telegraph Delivery Association's float, "A Moment of Happiness" was awarded Grand Prize in the 74th Tournament of Roses Parade in Pasadena on New Year's Day. The Grand Prize, given to the most beautiful float in Classes D, E, and F, is the highest Rose Parade award granted a commercial entry.

The FTD float was simple and stately, relying on the beauty of its design and flowers for effectiveness. It heralded the return of roses to the Rose Parade, using over 25,000 fresh roses in five different varieties — Red Delight, Golden Rapture, White Butterfly, Pink Sensation, and Sterling Silver.

Additionally, FTD authorized the use of 10,000 Cattleya orchids on its float — more than have ever been used on any float in the 74-year history of the Tournament of Roses.

The float has been under plan-

ning and construction for months. The first sketch was submitted last August to FTD's marketing committee and was approved with certain changes and recommendations. The intricate framework of the float consisted of three giant epergne vases 10 feet high, covered with mahoe hair fern and pompons standing in the terraced rose gardens. The metal work in forming the vases took over seven weeks of preparation, and involved over 8

San Antonio Meets January  
SAN ANTONIO, Texas annual San Antonio Spritival and Design School held January 19-20. Sponsored by the San Allied Florists Association annual event will be held El Tropicana motel in San Antonio.

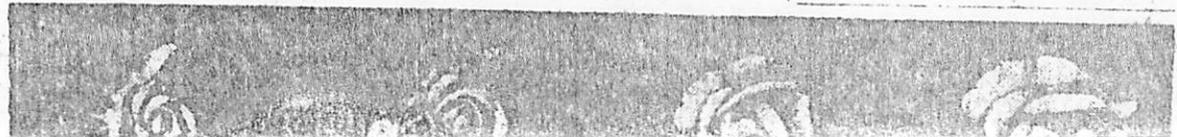
STADY - OSU

ASEN '63

ASEN - gave article on Flor. Rev. #131

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# Figures Show Breakthrough On Flower Longevity

**Used Sales**

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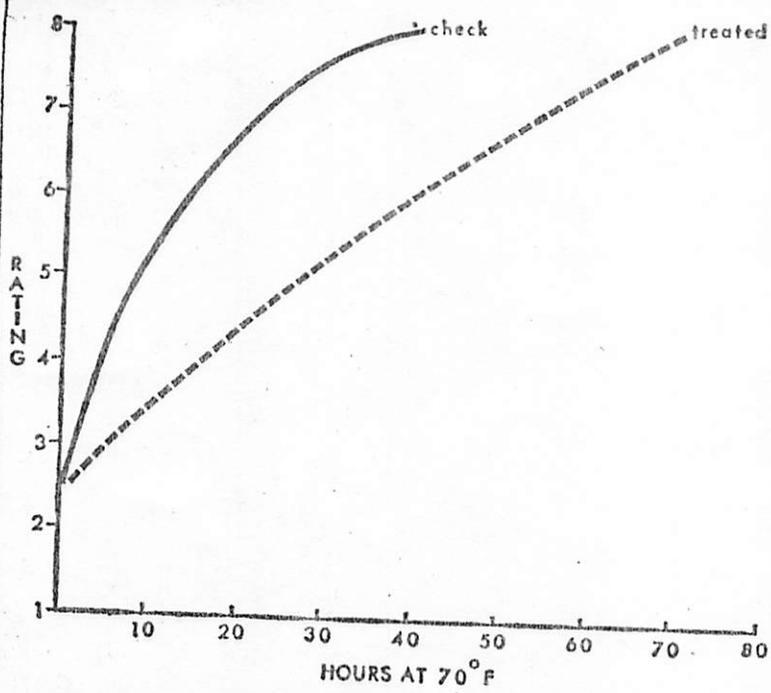


Figure 2. The rate of opening of Better Times roses as influenced by ethylene oxide. Treated roses were in an atmosphere containing 0.25 percent ethylene oxide for 20 hours.

(Continued from page 1)  
 3/ The authors are grateful to Gude Brothers and Company, Washington, D. C., for supplying the roses used in these experiments.

eventually arise for the construction of chambers and for the most efficient and practical method of obtaining the desired atmospheres. A serious drawback may be the narrow effective range of the gas above which injury occurs. Care must also be exercised in handling the gas because at very high concentrations it can be toxic to humans. The problems are many. They will require a great deal of research and understanding, but the discovery by Lieberman and Mapson (1) that ethylene oxide retards ripening and simultaneously inhibits the production of ethylene by fruit may be the major breakthrough the florist industry has been seeking for the finding of a method of increasing the keeping quality of cut flowers.

### Literature Cited

1. Lieberman, M., and L. W. Mapson. 1962. Inhibition of the Evolution of Ethylene and the Ripening of Fruits by Ethylene Oxide. *Nature* 196: 660-661.

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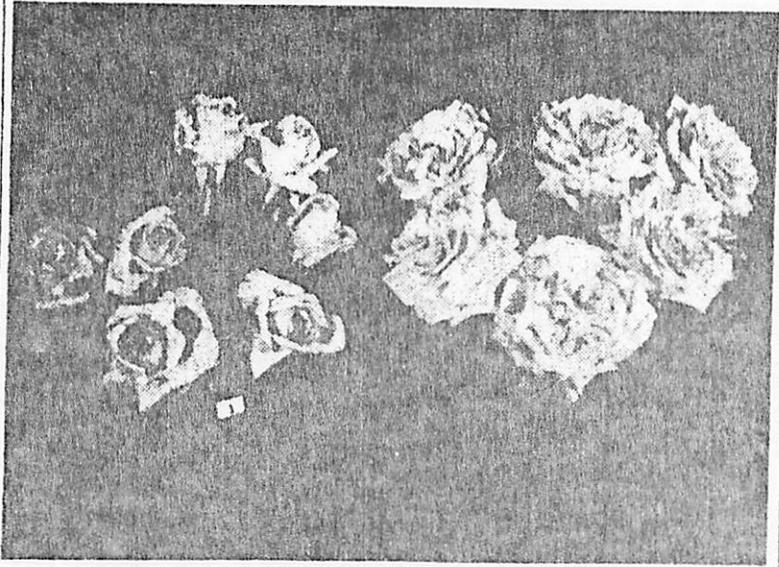


Figure 3. The effect of ethylene oxide on the keeping quality of Better Times roses after 40 hours at 70°F. Right—untreated roses. Left—treated roses in an atmosphere containing 0.25 percent ethylene oxide for 20 hours.

## Sixteen Appointed To WF&FSA Committee

WASHINGTON, D. C. — Sixteen wholesalers and suppliers from eleven states have been appointed to the membership committee of the Wholesale Florists and Florist Suppliers of America, Inc., according to committee chairman P. S. Cook of Norfolk, Virginia.

"The caliber of the men we have recruited for this committee and the enthusiasm they have displayed toward the business at hand, that is, gaining new members, leads me to believe this year's will be the most successful membership drive in WF&FSA's history," Cook said.

Those appointed to the 1963 membership committee are: Seymour Gebel, Carson and Gebel Ribbon Co., Dover, N. J.; Doc Murray, M&M Wholesale, Mobile, Ala.; Don Hook, Pittsburgh Cut Flower Co., Pittsburgh; George Greenlaw, S. S. Pennock Co., Philadelphia; Jim D'Orio, Denver Wholesale Florist Co., Denver; Vic Levy, Levy Associates, New York; Bud Rogers, Jewel Foliage Co., San Antonio, Texas; Bill Zappettini, William Zappettini Co., San Francisco; Jack Davis, Davis Brothers Florists, Inc., Denver; Floyd Claprod, Roman J. Clapwood Co., Columbus, Ohio; Elmer Day, Hill Floral Products Co., Toledo, Ohio; Joe Parrish, Atlanta Wholesale Florists, At-

**Hizzoner**  
 LANCASTER, Ohio — Walter Kaumeyer, a merchandising counsellor with the A. L. Randall Company of Chicago, is also the mayor of Lancaster.

Formerly connected with Kaumeyer Flowers here, his honor now represents Randall's in the state of Ohio.

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## FTD Names Odgers Sales Manager

DETROIT, Michigan — Ronald R. Odgers has been appointed sales manager of FTDA and will coordinate the expanded activities of FTD's 16 field representatives.

The representatives, who operate in territories throughout the United States and Canada, provide support for the association's member florists.

Under the expanded program, the field service representatives will conduct sales and management training meetings for

gases such as ethylene. Table 2 shows that ethylene levels dropped appreciably in all but the control bags, where the level increased to approximately 0.1 ppm. This level did not appear to be injurious, but the plant density in the commercial crates was much greater, providing greater potential for ethylene buildup. Plants in commercial storage also might have been exposed to temperatures higher than the 40 degrees F used in our trial. Although polyethylene film is permeable to ethylene, the loss of ethylene from the crates was, in all probability, slowed by the layer of film around the plants.

**CONCLUSIONS** — Although this study did not prove conclusively that ethylene was the cause of the difficulty with the commercial crop, it did show that exposure of dormant roses to relatively low ethylene levels caused a similar plant response. Further study is recommended to obtain conclusive answers. At present the plant producer would be wise to place an ethylene absorbent within the polyethylene liner in each crate to lessen the possibility of a recurrence of the difficulties encountered with the 1970 Mother's Day crop.

**Literature Cited**

- Hosek, R. F.; H. A. James, and R. H. Sciaroni. 1969. Ethylene—its effect on flower crops. *Flor. Rev.* 144 (3721):21, 65-68, 79-82; (3722):16-17, 53-56.
- Milbrath, J. A.; E. Hansen, and H. Hartman. 1940. Defoliation of rose plants with ethylene gas. *Science* 91 (2352):100.
- Shull, C. A. 1930. Effect of gas on plants. *Flor. Rev.* 67 1723:33-34.

**EDITOR'S NOTE:** "Ethylene Affects Dormant Roses" is Paper No. 7417 in the *Scientific Journal* series, Agricultural Experiment Station, University of Minnesota, St. Paul. The authors, R. E. Widmer and B. T. Swanson, are a professor and a graduate student in horticulture-plant physiology, respectively. The article was printed in the *Minnesota State Florists' Bulletin*, October 1, 1970.

**SAF roundup**

(Continued from page 56.)

are probably less irritating to sensitive persons.

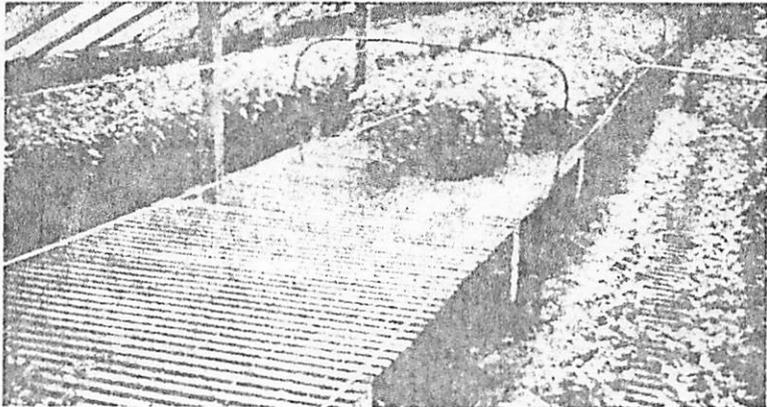
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**Obituaries**

**MRS. WONG SHEE LEONG**, 80, San Mateo, Calif., died recently. She was the widow of Leong Sum Chew, who founded Ah Sam Floral Co. in 1933 with their son, Gordon. After her husband's death in 1944, Mrs. Leong con-

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tinued to work with her children in the family business. The business will be continued by her daughter, Mabel, and sons Gordon, Lincoln and Arthur.

Another daughter, Louise, and 14 grandchildren also survive.

**TOM EARL EDWARDS**, 68, Santa