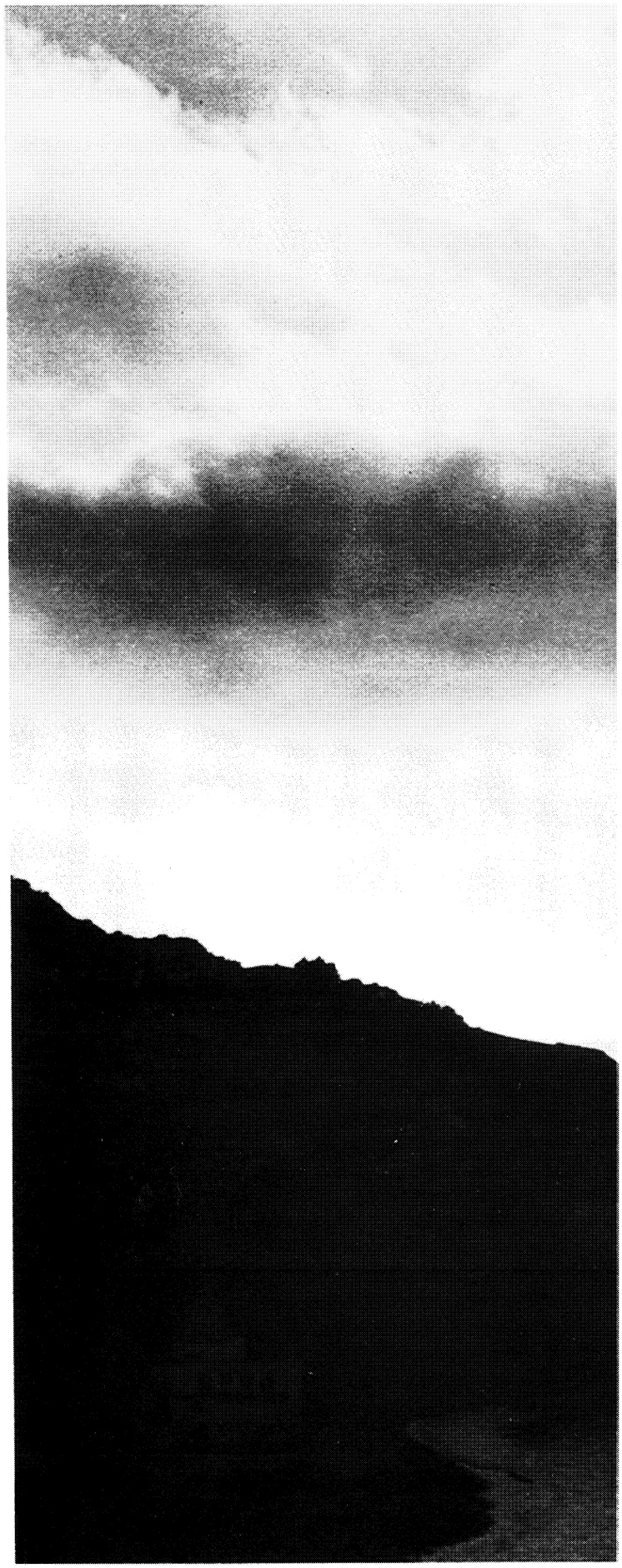
# recreation



## Hang gliders for sport

Those daring young men on their flying trapeze-like kites are hanging beneath colorful wings originally designed to recover spacecraft.

The wing was designed in 1948 by Francis Rogallo at what is now the NASA Langley Research Center. Free Flight Systems Co. in Sylmar, Calif., used the Rogallo design to manufacture hang gliders for sport.

The sport is growing rapidly. Free Flight produces about 1,000 gliders a month, and other companies are entering the field.

The wing is simple to control. Pulling back on the control bar allows you to pick up speed and at the same time lowers your altitude. Pushing forward slows your speed and levels you off. You push left to go right and vice versa. Birdmen can choose from prone, upright, or swing-seat harnesses in either kits or ready-to-fly gliders.

*'Esoteric' space technology comes down to earth dramatically in the form of recreational and consumer-product transfers.*

## Quartz-crystal clocks

A major problem in developing highly accurate timing equipment for the Apollo missions was obtaining a stable time base from which all mission times could be derived. Under contract with the Johnson Space Center, General Time Corp. developed a quartz crystal for the purpose, which later became the basis of consumer clocks and watches with an accuracy of one minute a year. The accurate watches are useful in timing sporting events as well as for general use.

When quartz is electrically stimulated, it can vibrate millions of times a second. Since timepieces use a vibrating body to keep time, the incredibly fast vibration of a quartz crystal—up to 4,194,304 beats a second—opened a new horizon in accuracy.

For the watches, General Time also incorporated micro-miniaturized integrated circuits to bring the quartz crystal into a usable configuration at reasonable cost. Called "quartzmatic," the clocks and watches now are sold under "Seth Thomas" and "Westclox" brand names.