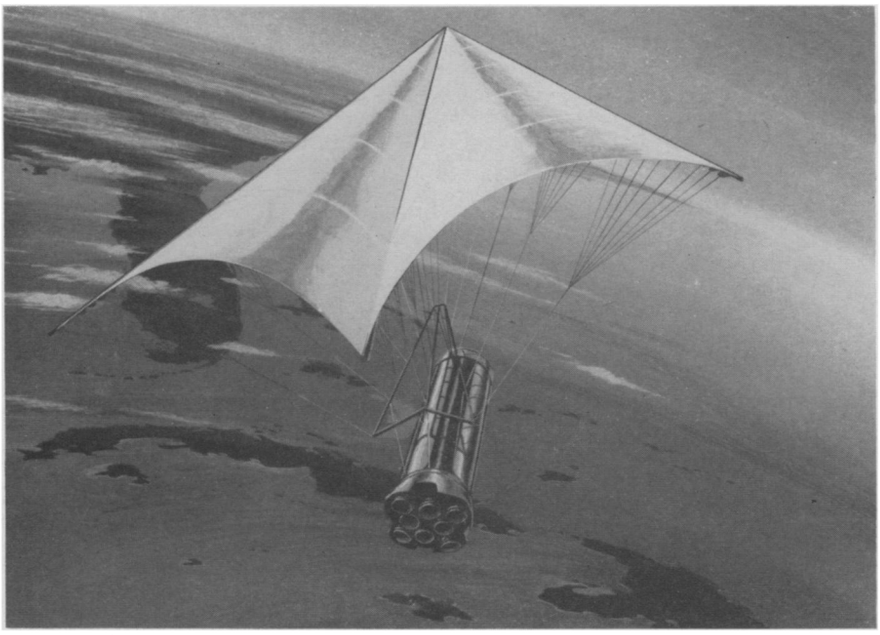

TOY KITE—The unique Flex Wing built by Ryan Aeronautical Company consists of a membrane of flexible material in contrast to the rigid surface of conventional wings and has been hailed as a new mobility concept.

METEOROLOGY

Moon Linked to Rainfall

➤ THE MOON'S CHANGING faces apparently affect rainfall and snowfall.

Precipitation is much heavier than usual during the week following new moon and full moon. This is especially true on the third to fifth days following both new and full moon.

The week following both first quarter and last quarter of the moon is lacking in heavy rainfall and snowfall. These findings do not mean, however, that the position of the moon can be used as a reliable way to predict day-to-day rainfall, the scientists who uncovered the relationship warn.

Astrologists and other persons have claimed they can forecast earthly events by the positions of heavenly objects. However, the principles of astrology used to relate lunar positions and rainfall are consistently in error.

There is as yet no explanation for the lunar effect on precipitation. The results suggest that not only the Tiros man-made satellites but the earth's only natural satellite is of importance to meteorology. The lunar-weather link has so far been established only for the United States and Australia, but other areas are under investigation.

The moon's relationship to precipitation was found in a statistical investigation of the records of extreme rainfall from more than 1,500 weather stations in the United States during the past 50 years. This information was related to the phase of the moon on the days of excessive amounts of rainfall.

The study was made by Donald A. Bradley and Dr. Max A. Woodbury of the New York University College of Engineering and Glenn W. Brier of the U.S. Weather Bureau in Washington, D. C., while on leave at Massachusetts Institute of Technology. Drs. E. G. Bowen and E. E. Adderley of the Commonwealth Scientific and Industrial Research Organization, Sydney, had confirming results for Australia on hand.

Their reports are made in Science, 137: 748 and 749, 1962.

The statistical tests the scientists made cannot be used to prove a cause-effect relationship between the moon and weather. However, the tests do show a very low probability that variations in the data due only to chance could have produced the association found between precipitation and the lunar cycle.

The relation between the gravitational force of the moon and ocean tides has been known for centuries. A lunar tide in the barometric air pressure measured at the earth's surface was demonstrated more than 40 years ago. However, this lunar air tide is quite small, roughly one-fifteenth that of the solar 12-hour pressure wave, which is not considered of any practical importance in day-to-day weather changes.

Therefore, meteorologists generally believed that appreciable effects of the moon on weather elements such as temperature or precipitation were neither possible nor detectable.

The discovery of at least one appreciable effect is an outgrowth of intensified research in meteorology during recent years, including use of such modern scientific tools as radar, satellites, rockets and electronic computers.

The changing faces of the waxing and waning moon are the most conspicuous and easily followed variations in the nighttime sky.

Since the bright moon shines only by reflected sunlight, its sunlit portions are seen in successively increasing or decreasing amounts as the moon revolves around the earth.

These are the phases of the moon, which run from new moon to first quarter to full moon to third quarter.

The interval from new moon to new moon is called a synodic month and averages about 29.5 days.

Mr. Brier said the original studies are now being followed to determine the extent to which geography affects the variations in precipitation, seasonal changes and tidal effects among other factors.

• Science News Letter, 82:206 September 29, 1962

AERONAUTICS

Toy Kite Lands Spaceship on Ground

➤ A $1 TOY kite will help make it possible for a multi-million-dollar United States manned spacecraft to land on solid ground.

The collapsible Rogallo "Flex Wing" now being developed to bring Gemini, the National Aeronautics and Space Administration's two-man space capsule, safely down to earth is modeled after a kite designed and sold commercially as a toy by Francis M. Rogallo, a NASA engineer, and his wife, Gertrude.

Mr. Rogallo, of NASA's Manned Spacecraft Center at Langley Field, Va., tested the toy in the 7-by-10 foot wind tunnel there. He found that by bending and twisting its flexible lifting surface, it could be adapted for guidance and landing of airborne craft.

Further research with John Lowry, head of the component section of the tunnel branch, provided evidence that the Rogallo wing could be adapted for glider use and even gave promise of returning payloads from space gently to the ground. Ryan Aeronautical Company of San Diego, Calif., was the first commercial aviation industry to explore the space potential of the Rogallo wing. However, the contract for its development to land Gemini has been awarded to North American Aviation.

The wing will be attached to the top of the spacecraft. Its size is about that of a packed parachute. During reentry, upon command either from ground control or the spacecraft, more than 50 feet of rubber or plastic-coated fabric will spread open like a fan.

By manipulating wires fastened to the ends and center of the fan, guidance is provided for landing the several ton space vehicle almost as gently as a bird floating to the ground. Guidance can be by automatic as well as manual control.

The wing edges and center can be inflated, if necessary, to provide more buoyancy if needed. They also can be made more rigid or relaxed to semi-rigidity.

The Rogallo wing has not been commercially successful as a toy, but U. S. experts in aerodynamic predict it will be a big success in space.

• Science News Letter, 82:206 September 29, 1962