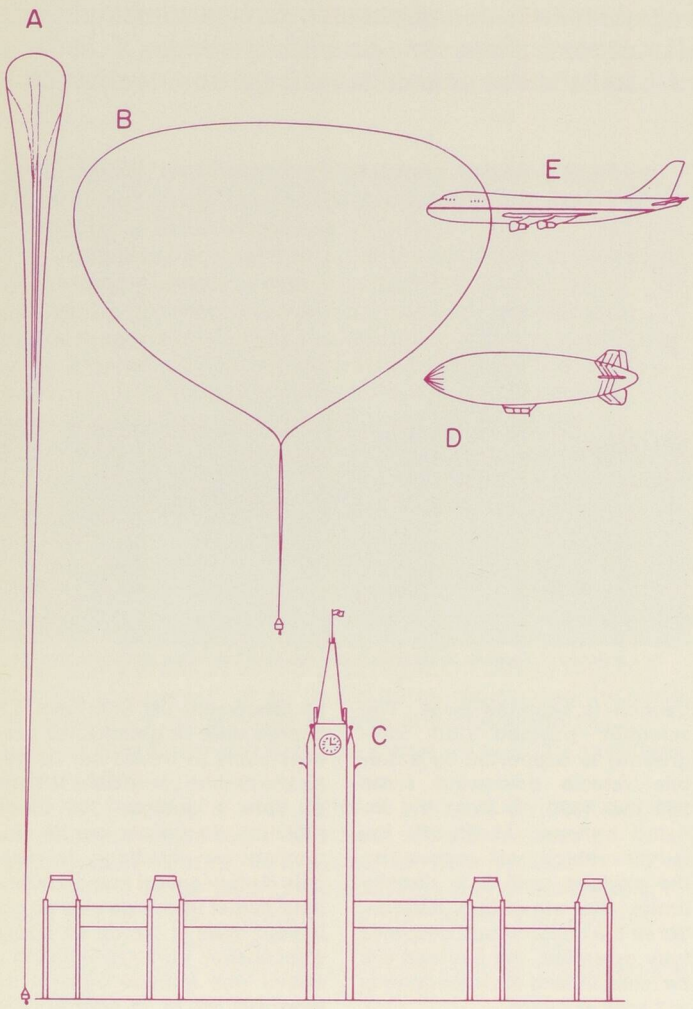
balloon launching



Miss/Mlle C.W. Clyde, NRC/CNRC

Relative sizes:
A. A scientific balloon at launch stands 790 feet (237 m) high.
B. At float altitude the largest flown from Yorkton contains 15 million cubic feet (450 000 m^3) of helium gas and measures 340 feet (102 m) wide by 270 feet (81 m) high.
C. The Peace Tower of the Parliament Buildings in Ottawa stands 301 feet (90 m) high.
D. The 192 foot-long (57 m) Goodyear "blimp" with a volume of roughly 200,000 cubic feet (6 000 m^3).
E. A Boeing "jumbo" jet is 231 feet (69 m) long.

Dimensions comparées:
A. Un ballon scientifique mesure 790 pieds (237 m) de haut au moment du lancement.
B. A leur altitude de croisière les plus grands ballons lancés de Yorkton contiennent 15 millions de pieds cubes (450 000 m^3) d'hélium, leur hauteur atteignant 340 pieds (102 m) et leur largeur 270 pieds (81 m).
C. La hauteur de la Tour de la Paix des édifices du Parlement, à Ottawa, est de 301 pieds (90 m).
D. Le dirigeable Goodyear a 192 pieds (57 m) de long pour un volume approximatif de 200 000 pieds cubes (6 000 m^3).
E. Un quadriréacteur Boeing "jumbo" a 231 pieds (69 m) de long.

Almost immediately, the control and command electronics in the payload are activated and radio contact is established with the ground. At the same time, scientific instruments in the gondola begin to receive and transmit atmospheric data as they will throughout the entire flight.

About three hours after launch, the balloon reaches its float altitude and begins a slow drift westward. The flight's path is, of course, governed by the direction of winds at this level (up to 145,000 feet) (44 000 m) while its duration depends upon wind speed. Although the trajectory and flight duration can both be estimated before launch, deviations are nonetheless possible and can lead to failure of the mission. So it becomes important to know the position of the balloon at all times for purposes of air traffic safety (required by Transport Canada), control and recovery.

Accordingly, balloons in flight are tracked constantly by the Pine Tree network of radar stations operated by the Department of National Defence. Also, each balloon is followed closely by a pursuit aircraft which maintains radio contact with the payload instruments. A number of safety devices built into the balloon ensure that any flight can be terminated instantly on command.

To ground observers during evening hours, high altitude scientific balloons resemble large, bright, circular objects in motion, looking unlike airplanes or common stellar phenomena. This visual effect is created at very high float altitudes where a balloon's plastic skin picks up and reflects light earthward from the sun. (The same process illuminates our Moon in the night sky.) At lower altitudes during hours of darkness, each rig is marked with flashing lights. Little wonder that rashes of balloon sightings are often reported as U.F.O.'s.

About 24 hours after ascent, each balloon is destroyed by radio signal, allowing the payload equipment to descend by parachute in the area east of Calgary, Alberta. The pursuit aircraft follows the descent closely and relays the landing position to a downrange recovery team on the ground. Finally, the payload is recovered by ground transportation or by helicopter depending upon the type of terrain. The many hours of planning and weather monitoring before touchdown optimize the chances of landing the equipment undamaged in a suitable impact area.

After recovery, the scientists' task of analyzing and interpreting data begins. During August, a solar telescope was flown by scientists from the University of Calgary while a program devised by the Atmospheric Environment Service of Environment Canada combined 12 experiments for simultaneous measurements of key stratospheric gases. Among these were chlorine compounds and oxides of nitrogen which play vital roles in the chemistry of the Earth's ozone layer.

Another balloon, launched for American scientists from the National Center for Atmospheric Research (NCAR), carried an experiment called the Cryogenic Whole Air Sampler designed to collect atmospheric constituents at many altitudes.

"The whole operation," notes Mr. Charko, "aroused a good deal of interest from international organizations some of whose members attended these launchings as observers.

"Already", he adds, "we've received numerous proposals from scientists for experiments to be sent up in the coming months and in fact, besides two launches set to go in January, we're well under way with plans for another series next summer."□

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