

# A NEW WAY OF CLEARING FOG

by David Bowen

David Bowen Weather Services, Bideford, Devon

**Invented by Chilean scientists, the "fog broom" has recently been tested successfully under laboratory conditions in the USA. It could help sweep away localized patches of fog in inconvenient places**

In the United States an attempt is now being made to develop a method for clearing fog. According to Mr W. R. Bellis, Director of Research and Evaluation of the State Highway Department, New Jersey, tests made so far under laboratory conditions have been completely successful. The device used is known simply as a "fog broom". When fog passes through it the air-borne water droplets are collected until the obscurity is finally cleared.

The frame of a fog broom is made of aluminium, 2½ feet wide, 4 feet in length and 2 inches thick (see photograph right). It is wound in the direction of the longest dimension with monofilament nylon, 12 thousandths of an inch in diameter, spaced at ten strands per inch, on the front and back faces of the frame: so that the strands in one plane are behind the spaces between the strands in the other plane, giving an effective spacing of 20 strands to the inch. (Mr Bellis tells me these dimensions "are not sacred or inviolable", but have been found satisfactory in practice; they may be changed in future experiments.)

The fog broom rotates horizontally with the larger axis and the nylon strands in a vertical orientation. The fog's moisture particles then collect on the nylon fibres—the result of a combination of physical adhesion and electrostatic attraction. Droplets grow in size until they are heavy enough to run down the strands (which are not wetted) and fall off the fog broom at the bottom. There is some effect of centrifugal force, and some of the drops of water have been observed flying off the side of the broom as it is being rotated.

"Under controlled laboratory conditions," declares Mr Bellis, "we create a fog in our chamber (30 ft by 20 ft by 10 ft high) wherein the visibility is reduced to 5 ft or less. We have been able to clear this fog in four to five minutes with ten brooms in operation. This same fog requires about 30 minutes to clear by itself without the operation of any of the fog brooms. Each

David Edward Bowen, 41, is a meteorological consultant and weather correspondent, engaged in the interpretation of weather data for industry and commerce.

broom collects about 6 ml of liquid water per minute. We are currently preparing to conduct experiments out of doors in natural fog."

Apparently, materials other than nylon have been used in making fog brooms: for example, Dacron, polypropylene, rubberized horse hair and enamelled copper wire; but they do not work so well as nylon. Additional tests with alternative materials are still being made, and all are used at 8-lb test when fully wound.

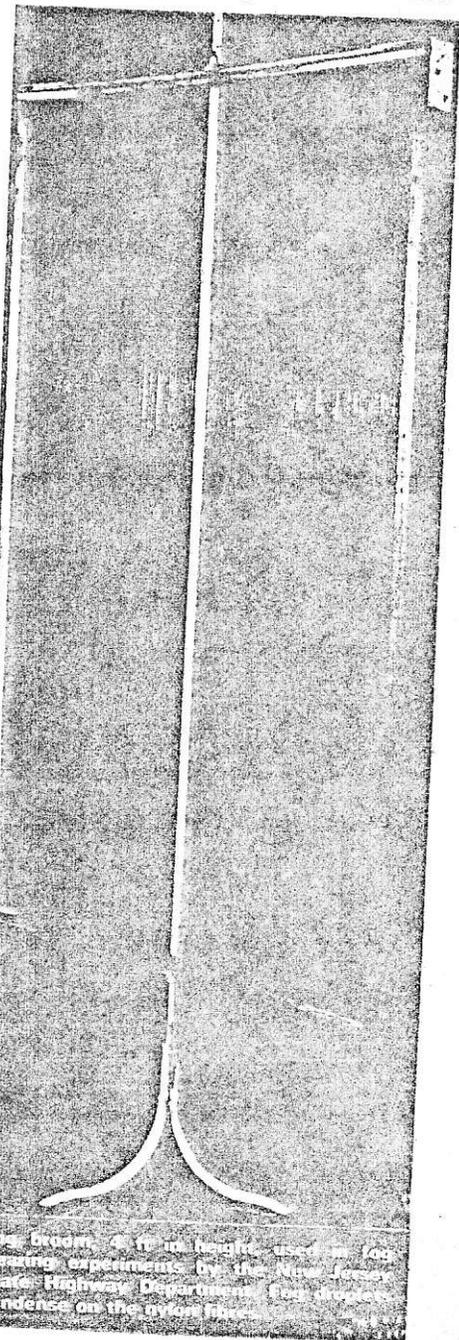
No statement has yet been made by the New Jersey State Highway Department regarding the scope of the planned outdoor experiments. It is probable, however, that they will be conducted on high-level motorways where foggy weather is fairly marginal and well localized. If the fogs selected are manufactured by a moving airstream, and not of the windless radiation type, it should be possible to erect non-rotating fog brooms set up at right angles to the wind. These will be easy to erect and to operate, even if it is necessary to adjust their positions from time to time.

Credit for the invention of the fog broom goes to a team of research scientists from the University of the North, at Antofagasta, Chile. They noticed that, in the Atacama desert—in some areas of which rain has never been known to fall—cactuses growing to 6 ft in height are fed by drops of water condensing on to their leaves as fog drives inland each afternoon from the Pacific. With the idea of creating small but nevertheless valuable amounts of water over the desert from the daily fog blanket, the scientists experimented with various configurations of nylon thread and nylon mesh, attached to frames and strung between high poles or across chasms in the path of the incoming fog.

As with the New Jersey experiments, water droplets collected on the nylon thread and ran to the bottom of the frames. It was then collected in troughs from beneath the frames and allowed to run to a storage tank. Each frame, 4 ft deep and strung vertically with 1-mm nylon thread, collected approximately 4 gallons of water per square yard on days of heavy fog. The average amount collected from one 4-ft frame in the course of a year in the Atacama is 220 gallons.

The Chilean experiments began in 1965, whereas the fog broom device in New

Jersey was not fully tested in the laboratory until the early part of this year. If the new outdoor experiments are successful it should be possible to apply them to help relieve Britain of some of her fog problems. Wherever fogs are well localized, such as in closed valleys, fog brooms may be used to accelerate the natural process of clearance.



The broom is a device used in fog clearing experiments by the New Jersey State Highway Department. Fog is condensed on the nylon fibres.