

A Science Service Feature

Released upon receipt  
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December 28, 1932

? WHY THE WEATHER ?

Mailed December 21, 1932

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A WASTE OF FIREWORKS

The practice of firing explosive rockets at the clouds to prevent the fall of hail, now popular in the German state of Württemberg, has called forth the following pertinent comments from Dr. E. Kleinschmidt, director of the local meteorological service:

Numerous theodolite measurements made last spring showed that the rockets exploded at an average height of about 2,200 feet. This is decidedly lower than the base of the average cloud from which hail falls, and only from one-third to one-seventh of the height at which freezing temperature, necessary to the formation of hailstones, occurs in summer.

The energy of the explosion is about 500 kilogram-calories; as compared with the countless billions of kilogram-calories of energy involved in the production of a thunderstorm, with its attendant hail. A rocket exploding on the ground produces no air wave perceptible (except as sound) to persons standing a few yards away. One bursting in the air produces a smoke cloud about a cubic yard in size. In still air this cloud has no tendency to rise or fall; hence the explosion cannot affect in any way the violent vertical uprush of air that is the most prominent mechanical feature of a thunderstorm.

The noise of the explosion cannot stop the formation of hail, since the much louder noise of thunder has no such effect. The smoke particles do not aid hail formation by promoting condensation, since no such effect is observed over a big industrial town, for example, which produces vastly more smoke. Electrical effects, if any, must be utterly insignificant in comparison with the natural electrical forces of the thunderstorm.

A very intensive system of reporting and charting hailstorms prevails in Württemberg. Comparing these records with the records of shooting operations, Dr. Kleinschmidt found that in the great majority of cases the rockets were discharged at places so far away from the well-defined tracks of hailstorms occurring the same day - or, in some cases, on days when no hail fell anywhere - that the absence of hail at these places could not be attributed to the rockets. In several cases hail fell in spite of the firing. Lastly, hail really did cease soon after firing in a number of cases, but it would have done so without any firing! An analysis of the records of 900 hailstorms in Austria showed that the local duration of hail in 24 per cent. of them was less than 2 minutes, while in only 8 per cent. did the hail last at one spot longer than 12 minutes.

Last but not least - even if the process were effective, the protection of the agricultural lands of Württemberg from hail by means of rockets would cost more than twice as much as hailstorms now do, on an average, over the same area!

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