

Thus, in the seed of both lettuce and *Nemophila*, inhibitory effects are produced by infra-red and blue, and in lettuce seed these two spectral regions show similar interaction with red. These observations suggest that either the photoreceptor involved in the infra-red effects has an absorption region also in the blue, or, alternatively, that some distinct blue absorbing photoreceptor is capable of energy transfer to the infra-red receptor.

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Artificial Stimulation of Rainfall in East Africa by Means of Rockets

EXPERIMENTS on artificial stimulation of rainfall have been carried out by the East African Meteorological Department since 1950. The earliest experiments at Kongwa, Tanganyika, in 1951, using silver iodide, were inconclusive, but the evidence suggested that this substance was not efficient as a seeding agent in East Africa¹. Later, experiments using the balloon-bomb technique and sodium chloride were carried out at Kongwa in 1952, Amboseli, Kenya, in 1953 and Dodoma, Tanganyika, in 1954. In the 1952 Kongwa experiment there was an increase in total rainfall down-wind from the seeding position and in both the Amboseli and Dodoma experiments it was observed that cloud-seeding usually produced light rain².

In the latest series of experiments during November–December 1956 at Tabora, Tanganyika, rockets were used for cloud-seeding. In conjunction with the Ministry of Supply and the Admiralty, 2-in. naval flare rockets were modified to carry a charge of about 1½ lb. of finely ground, desiccated sodium chloride in the head. The rockets could be fired at any chosen cloud and were fused so that the sodium chloride was well dispersed in the cloud during the passage of the rocket. The cloud-seeding took place over the Tabora reservoir catchment area and a network of 30 rain-gauges was laid down in the saucer-shaped region, which covered an area of about 20 square miles. In the absence of a control area, the experiment was conducted on a randomized basis; the decision as to whether cloud conditions were suitable for seeding was made first and sealed instructions prepared by a random process were then consulted to determine whether seeding should take place or not. There were approximately the same number of seeding and non-seeding days and, so far as could be determined, weather conditions were suitable for cloud-seeding during both periods.

Some of the results appear to be significant. A comparison between total rainfall on seeding and non-seeding days showed that the rainfall in the catchment area immediately down-wind of the rocket-launching site tended to be a minimum during the non-seeding period and a maximum during the seeding period, the difference between the two

periods being of the order of 2 to 3 inches. The time lapse between seeding and the appearance of rain varied considerably with an average of 9 minutes, which is much shorter than the times estimated by Ludlam³ and Bowen⁴. A possible explanation of the earlier appearance of rain may be the instantaneous and wide dispersal of the sodium chloride and the increase of turbulence within the cloud produced by the passage of the rocket.

Certain conclusions can be drawn from this experiment. The rocket technique is an accurate and efficient method of cloud-seeding and compares favourably with seeding by aircraft. It would appear that sodium chloride is an efficient seeding agent in East Africa and that clouds may be induced to rain earlier and more heavily than they would have done naturally. There is strong evidence that clouds which are unlikely to rain naturally can be induced to precipitate by seeding with sodium chloride.

A full report of the experiment is in course of preparation and will be published elsewhere.

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Surface Hardening of Metals by Spark Discharge

THE local hardening of sparked metal is described by Welsh¹ as relying upon transfer from the electrode and/or contamination by the surrounding medium. When discussing these hardening and etching effects in ferrous metals it was mentioned² that Rawdon³ obtained them even when electrolytic iron was self-sparked *in vacuo* or in argon. In these cases there would be no transfer, and the only contamination might be from any hydrogen in the electrolytic iron.

The recent discoveries that 'whiskers' of iron are crystals containing only one or at most very few dislocations, with consequent high hardness (tensile strength 850 tons/in.²)⁴ and immunity from etching effects, suggests that sparked iron may contain fewer dislocations than normal.

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Intensity of Remanent Magnetization of Archaeological Remains

Two recent contributions referring to the remanent magnetization of archaeological material show the need for more experiments. Elsasser, Ney and Winckler raised doubts about the accuracy of dating by radiocarbon¹. Their argument was that radiocarbon is formed by the action of cosmic rays; that this action is in part governed by the intensity of the Earth's magnetic field; that this intensity varies—