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**Operation Greenhouse, Scientific Director's Report, Annex 4.1, Cloud Studies, Parts I, II, and III, Nuclear Explosions, 1951**

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**Abstract:** The cloud physics project was primarily intended to fulfill a requirement for detailed information on the meteorological microstructure of atomic **clouds**. This requirement arose from the speculation that radioactive material could be deposited by the scavenging action of rain falling from the atomic cloud. More factual information was required on the properties of atomic **clouds** before definite answers could be given to these questions. With the time available, advantage had to be taken of existing equipment rather than wait for the development of more suitable gear. Aerographs were chosen as the test equipment since they offered the best solution to the many conditions. These devices were installed in the drone aircraft, and they operated satisfactorily in each of the aircraft on all tests. The equipment measured and recorded the airspeed, air temperature, relative humidity, and static pressure parameters. Inspection of the records led to the conclusion that the majority of the drones penetrated the stem cloud beneath the main mushroom cloud. Confirmation of this conclusion was obtained from the Director of Program 4, who stated that the flights were planned this way since it was feared that severe turbulence in the main cloud would cause a high loss of drone aircraft. Analyses of data obtained by the aerograph equipment revealed the following conclusions concerning the meteorological properties of atomic **clouds**. (1) The cloud properties depended greatly on the conditions in the environment air, particularly the moisture content. The stems of both Dog and Easy **clouds** were found to be dry. George cloud, which was formed in air having high humidities up to 10,000 ft, had a stem cloud composed of water drops. (2) The temperatures inside the stems, even at relatively short times after the explosions, differed very little from ambient temperatures.

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