became interested in science before they entered kindergarten [*Science News Letter* (15 Sept. 1962)]. A recent study reported in the *Journal of Abnormal and Social Psychology* (June 1963) tends to show that the most imaginative children are 8- to 10-year olds [*Science News Letter* (20 July 1963)].

Many scientists have reported that their greatest drive toward a scientific career occurred when they were required to carry out a project. Of course, the best performance probably will be from those who possess a desire to excel and have the skills and facilities for doing so. The majority of award-winning projects result from science club activities and extracurricular effort. Similarly, extracurricular effort is necessary for recognition in sports, arts, or letters, too.

The editorial also suggests that ". . . school, city, and state competition should be limited to the more advanced students." A visit to an elementary school science fair will disclose considerable originality of thinking and presentation even by kindergarten children. A student of any age takes pride in exhibiting a project which he has dreamed up. He also shares his joy with those who have encouraged and guided him.

The editorial states: "Greater emphasis on science instead of gadgetry and showmanship is desirable." There was not a single gadget among the 411 exhibits shown at the 14th NSF-I (catalog of exhibits available to anyone on request). Gadgets rarely if ever bring top recognition at regional fairs. Accepting the editorial statement that children are plastic, they quickly learn to shy away from things which cannot win.

Any student who says, "but this makes a better exhibit" either has not been in a fair before or has not paid attention to the judging criteria or their values. Dramatic value—showmanship, if you will—counts for only 10 points. Creative ability and scientific thought provide 60 points. Nearly all local fairs use the same criteria and point values as the NSF-I, and these point values hold for all levels.

Science Service will not only welcome but will provide every assistance possible toward a study of science fairs. Science Service, which stimulates nationally and internationally the science youth program, including science fairs, is very cognizant of the need for minimizing the less desirable aspects of science fairs. It is encouraging that the science fairs are receiving attention and appreciation, which is most evident through the helpful criticism of details of operation.

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Jets, Meteors, Missiles, or Rockets?

The "cloud" described by J. E. McDonald [*Science* 140, 292 (19 Apr. 1963)] is quite similar in appearance to one that I photographed in Sunnyvale, Calif., at 5 P.M. on 1 May 1963.

I first saw this cloud at 4:50 P.M. and it stayed visible as a circle until almost 6:15 P.M. by which time it had spread out and was dissipated over a very large area. It was the only "cloud" in an otherwise perfectly clear sky. My "cloud", however, was nothing more than a contrail formed by a jet aircraft maneuvering at high speed.

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In connection with the stratospheric cloud formation over Flagstaff, Arizona, the estimated 35 kilometer altitude should be well within the capability of the X-15 rocket aircraft—operated from Edwards Air Force Base, roughly 350 miles away—for forming condensation trails due to its high energy exhaust. This distance and the necessary elapsed time are not unreasonable for the winds of 150 or more knots frequently reported at stratospheric altitudes. Stability of a cloud over such a time period might be questionable, but the cloud was not changed sufficiently to be reported over an observation interval of about half an hour. The cloud formation shown on the *Science* cover, indicates considerable structuring currents and differential winds at various altitudes and positions, such as are usually seen in lower contrails. It also appears in the picture on page 293 that the cloud need not be a closed loop, but a highly curved line. Winds could have a suitable effect here too.

Infrequency of X-15 flights might make it worthwhile checking on the possibility of a missile launch from the Pacific Missile Range—about 150 miles further west than Edwards.

Another possibility lies in the reports collected by H. H. Nininger [*Out of the Sky* (Dover, New York, 1959)] of highly curved dust trails left by friable, low density meteors and of wind distortion of these trails. Figure 7 on page 46, and Figs. 3, 4, and 5 of plate II opposite page 130 (discussed on pages 51 to 58 and 114) show some very large initial curves and spirals, which might, in this case, have served to reduce the required elapsed time for differential wind formation of the horseshoe line shape. In recent years such spiralings have become well understood as cases of meteors with flattened shapes of high aerodynamic lift and relatively low weight. McDonald's reported observation of a small looped cloud to the northwest of the main cloud might also be consistent with a recent meteor entry at a very shallow angle, a rocket plane trajectory, or a much earlier vertical launch of a very high energy rocket.

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Bertone has evidently overlooked the third-from-last paragraph in my report, since I pointed out two conclusive reasons why the Flagstaff cloud could not have been a contrail. We have no operational aircraft that can maintain level flight at the altitude of the Flagstaff cloud, and it is not physically possible for jet contrails to form at that altitude in the first place. . . .

Thermodynamic computations indicate that the maximum altitude to which the X-15 engines might lay down condensation trails is about 27 km, whereas my present estimate of the altitude of the Flagstaff cloud is 43 km.

Edwards Air Force Base officials have sent me the X-15 flight schedules, and no flight was made on that day or within several weeks of that date. Finally, burnout altitude on the X-15, in a high-altitude mission, happens to be almost exactly at the cloud's altitude; hence no sort of 150-mile-long trail could be caused by the X-15 in its present state of development.

Howard's further suggestion that this might have been some sort of rocket debris is being very thoroughly checked.

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