

Feb. '96 Meeting - Dr. Alan Hale

By Dave Thomas



The February 16th 1996 NMSR meeting with Alan Hale was one of our most memorable and well-attended ever. Dr. Hale, who works at the Southwest Institute for Space Research in Cloudcroft, NM, spoke on “Comet Hale-Bopp: Potentials and Opportunities.” Hale began by quoting Isaac Asimov: “The most exciting phrase to hear in science, the one that heralds new discoveries, is not ‘Eureka!’ (I found it!) but ‘That’s funny’...” Hale’s specialty is extrasolar planets, but he has had a longtime interest in comets. One Friday night last year, he was trying to confirm the brightness of a comet he was researching for his weekly column in the *Alamogordo Daily News*. However, it was cloudy, so Hale tried again the next night (Saturday, July 22nd, 1995). Hale went outside near 11 PM, but the comet was hidden behind his house. After checking on a different comet he’d been following, Hale had to choose between moving his telescope, or waiting an hour or two for the other comet to rise above the house. Dr. Hale chose the lazy (and lucky!) alternative. While he was waiting, he checked out the globular cluster M70, located in the constellation of Sagittarius. He had just observed M70 a few weeks earlier, but this time he noticed something that was not there earlier - a funny-looking “fuzzy object.” Hale increased his telescope’s magnification, and the object still looked fuzzy - it was not a group of stars. He then confirmed that he was indeed looking at M70. Hale began to suspect that the object might be a comet, but at that point thought it unlikely to be previously unknown - he joked to himself “Sure, I just point my telescope at a random spot in the sky and find a comet!” Dr. Hale drew a diagram of the object’s position, and measured its brightness. If it was a comet, the object would visibly move against the star background in a matter of hours. So, Hale decided to check the object again in a few hours. He went upstairs to consult his catalogs, but found no known comet, galaxy, star cluster, etc. that would appear near M70 that night. Hale logged into the Internet to check the Central Bureau for Astronomical Telegrams at Cambridge, Massachusetts, but found no information on his possible comet. He e-mailed a tentative notification to Cambridge, went downstairs, and checked the object’s position again - *it had moved to the West*. At this point, Dr. Hale began to get very excited. He ran upstairs, sent another e-mail message to Cambridge, and woke up his wife to ask her “Do you want to have a look at Comet Hale?” He followed the comet until 3 AM, when it set. The tired astronomer tried to sleep for a few hours. In the

morning, he received an e-mail message from Brian Marsden at Cambridge, which said that Thomas Bopp, in Arizona, had confirmed the location of the new comet. It turns out that Bopp and Hale had observed the object within just a few minutes of each other. Because Bopp was out in the “boonies,” however, Hale's message reached Cambridge first. Hale also gave a better window of the timing of the discovery than Bopp, so his name appears first. The new comet was announced as Hale-Bopp in International Astronomical Union circular 6187.

The first order of business was the determination of the new comet's orbit. Normally, comet positions can be obtained by looking at the parallax between observers widely separated on the Earth. But Comet Hale-Bopp was too far away for parallax to be effective. And for a comet to be visible at this great distance, it must be really large. Orbital calculations were performed, and these indicated that the orbital period of Hale-Bopp is about 4,200 years. In this trip through the inner solar system, Jupiter will affect the comet, reducing its period to 3,400 years. All this is good news for comet watchers, because it indicates that Hale-Bopp has definitely visited the inner solar system before. Comets on their first trip in from the Oort Cloud have very large orbits (on the order of 10,000 Astronomical Units (AUs)), and correspondingly long periods (millions of years). One AU equals about 149 million kilometers, the average Earth-Sun distance. “Virgin” comets are thought to be covered by layers of organic “crud,” which are thought to be burned off on a typical comet's first near-Sun pass. Thus, comets coming in for the first time are not as bright as they are on return trips. Many astronomers think this is the reason that Comet Kohoutek was not as bright as hoped; Kohoutek, also a large comet, will probably be truly spectacular on its second trip around the sun (in a mere 75,000 years). As regards Hale-Bopp, however, the news is good - its “short” (4,000-year) period suggests that it has interacted with the planets before, and that its outer coating has already burned off. This, in conjunction with the comet's large size (about 40 km long, three times the size of Halley's comet) may mean we are in for a really big show in 1997. The comet will come closest to the Earth (within 1.3 AU) on March 22, 1997, and will be closest to the sun 10 days later (April 1st). Tabloid reports of an April Fool's Day Hale-Bopp impact on Earth are simply incorrect.

Dr. Hale mentioned that the comet will be visible with binoculars in March, and visible with the naked eye by mid-summer 1996. He recommended that telescopes should not be purchased at department stores, where quality is low and price high; his suggestion is to look at the advertisements in *Sky and Telescope* magazine. Hale hopes to observe the comet during a total eclipse of the sun on March 9, 1997, in Mongolia/Siberia (brrr!).

Hale then turned to a discussion of the “hype” surrounding Hale-Bopp and other comets. Richard Hoagland (of “Face On Mars” fame) has declared that Hale-Bopp is under the control of a mysterious alien. Quatrains written by Nostradamus in the 16th century, as well as Hopi Indian prophecies, are now being cited as predicting the appearance of Comet Hale-Bopp. In the 1910 appearance of Halley's Comet, unscrupulous individuals hawked “Comet Pills” to counteract the ill effects of poisonous

gases in the comet's tail, even though the total amount of such gases was actually extremely small.

Dr. Hale plans to take advantage of his comet's fame to promote increased science literacy. A WEB site is in the works. He cautioned against complacency about asteroid/comet impacts on the Earth. Although Hale-Bopp will miss Earth by more than 1 AU, the newly-discovered Comet Hyakutake will come within 0.102 AU of our planet. Hyakutake's near-miss of Earth will occur in late March of this year; it was discovered in late January. That's not very much advance warning.

NMSR thanks Dr. Hale for a very entertaining and thought-provoking talk, and thanks Mark Boslough for making the initial "contact." And, we salute Alan Hale for his continuing efforts to encourage public appreciation of good science.