By the time you receive this issue your school year will be well underway. We at the Center hope that it will be your best yet. Please call on us if we can help you have your best year yet.

For those of you who are receiving the Kansas Science Teacher for the first time, let me introduce ourselves. The Kansas Science Teacher is the newsletter of the Science Education Center at Emporia State University. Through this and future issues we plan to keep you informed of the activities in science and mathematics education in Kansas and especially those activities of the Center.

The Science Education Center

The Science Education Center at Emporia State University has two major functions both directed to the improvement of science and mathematics education in Kansas K-12. The first function of the Center is to maintain and circulate a rapidly growing collection of quality science and mathematics materials for grades K-12. By using this collection teachers can have an opportunity to find enrichment activities and materials for use in their existing curriculum and/or to examine complete sets of curricula materials for possible adoption in their school. By using our materials teachers can try out a curriculum with their students before they order it for their school.

The second function of the Center is to coordinate all inservices and pre-service teacher education programs in science and mathematics conducted by the faculty at Emporia State. The Center also organizes inservice programs of all types for individual schools and districts.

The Center is open Tuesday and Wednesday evenings during the regular academic year from 7:00-9:30 p.m. A graduate student is on duty to help. The Science Education Center is located in Science Hall 177 on the E.S.U. campus. The Center phone number: (316) 343-1200 Ext. 314 or 473.
COMET HALLEY

When and Where do I Look?

By

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Observing a comet with an orbital period of 75 to 76 years is a once-in-a-lifetime experience. And our turn has come for observing Comet Halley.

The drama of actually seeing Comet Halley (it is pronounced to rhyme with "valley") began with a successful sighting on October 16, 1982, at Mount Palomar Observatory in California. The Comet was a billion miles away from the sun—beyond the orbital distance of planet Saturn. At that distance it was equivalent in brightness to a candle seen at a distance of 27,000 miles (which is more than one earth circumference)! Yet that observation assured us of its unmistakable return. (It has been reported to have been seen on all returns, or apparitions, except one since 240 B.C.)

We should have three opportunities for observing it as a naked-eye object if the Comet develops as anticipated. The first opportunity will be in the evening sky between late December and late January; the second in the morning sky between early March and early April; and then finally in the evening sky between mid and late April. See the figures accompanying this article.

For those desiring to get a "first" look at the object, circumstances for finding it in November are reasonably promising. On the evening of November 10, 1985, the Comet will be positioned 7° to the north (7° higher in the sky) of the star Aldebaran in the constellation of TAURUS. TAURUS will be to the west (ahead) of the constellation ORION in the southeastern sky about 9:00 p.m. Aldebaran is the bright, reddish star in the Hyades star cluster which forms the face of the Bull (TAURUS). A binocular will be required because the Comet will be too faint to be seen with the naked-eye. (Its predicted brightness, or apparent magnitude, \( m \), is 7.9. To be seen with the naked-eye with excellent vision and no light interference requires a magnitude of 6.0 or less.)

Also, 7° of angular measure may be approximated by considering the following: the moon is 0.5° in angular diameter, or the "pointer star" of the Big Dipper are 5° apart. A little practice with a binocular will allow a person to approximate 7° and then begin a search. (Or, if a person has access to a telescope with setting circles, the coordinates of the Comet on November 16, 1985, are as follows: R.A. 04^h 38^m, Decl. +22°19'.)
A second good opportunity to search for the Comet before it attains naked-eye visibility is on the evening of November 16. By then it may have brightened to a magnitude of $m = 7.4$. On that night it will be 2° south (lower in the sky) than the Pleiades ("Seven Sisters") star cluster. Thus, a person should be able to see it in the same binocular field of view as the Pleiades. Again, for those using a telescope with setting circles, the right ascension is $3^h51^m$ and the declination is $+21°53'$. 

By mid to late December the Comet should have developed a sufficient coma around the 6 kilometer chunk of ice (frozen water, carbon dioxide, methane, ammonia, cyanogen, etc.) and dust to allow it to be seen with the naked eye. Look for the Comet in early January, 1986, about 30° above the southwestern horizon an hour-and-a-half after sunset (after evening twilight). On successive nights it will be lower in the sky after evening twilight and closer to the direction of west. But it should be brightening and developing an appreciable tail (or tails). By the end of January it will be too close to the sun to see.

February 9 the Comet is at perihelion, the closest to the sun that it will be on this encounter (0.6 AU; AU abbreviates the Astronomical Unit). Since the Earth in its orbit is on the opposite side of the sun from the comet, we unfortunately will not be positioned to see it when it may have its most developed and longest tail(s). That is unfortunate!

Our next opportunity to observe the Comet will be from early March to early April. It will be in the morning sky and visible prior to morning twilight (90 minutes before sunrise). Early in March it will be visible low in the east-southeast, but by April it will be low in the sky above the southern horizon.

The final chance for observing Comet Halley as a naked-eye object will present itself in mid to late April (and possibly as late as mid May). Again, it will be an evening object. If one were to look at the end of evening twilight toward the southeast, one would see the Comet low in the sky. On successive days it will be positioned slightly higher in the sky and further toward the south. It will gradually be dimmer as it recedes slowly among the stars.

On any of these observing occasions do not expect something to "flash" by like a meteor or "shooting star." That will not happen. As the Comet orbits the sun it will gradually shift its position relative to the star background. That is why it will appear higher or lower in the sky on successive nights during one of these windows for observing. On any given night, due to the rotation of the Earth, it will gradually move toward the horizon if viewed in the evening; or it will gradually move away from the horizon if viewed in the morning sky prior to sunrise.
For those of you who have a subscription (free) to the Kansas School Naturalist (or perhaps your library or another teacher may receive it), and who wish additional information about comets and Comet Halley, the Fall issue is titled "The Return of Comet Halley, 1985-86." Recent issues of "Sky and Telescope" and "Astronomy" magazines have also featured articles concerning Comet Halley. The Peterson Planetarium at E.S.U. will also feature Comet Halley programs during the period of predicted naked-eye visibility for the Comet.