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A report of activity during "Total solar eclipse – 1995"

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"KHAGOL MANDAL" is a group of 'Amateur Astronomers' and skywatchers based in Bombay and actively involved in popularization of astronomy, in local language, amongst students and public in general. Established in 1985, Khagol Mandal is a recognised and registered educational group under respective law and has a membership strength of over 800 spread all over in Maharashtra state. The Mandal has several dedicated volunteers and is regularly organising full night skywatching programmes, lectures, slide shows, basic and advanced courses, quiz contests etc., for the last 10 years on various astronomical subjects.

The Total Solar Eclipse of October 24, 1995 (TSE-95) was the event of the year for us. The preparation for the event started a year before, all over India, by various professional as well as amateur institutes and associations. 'Khagol Mandal' decided to celebrate the year 1995 as the 'Eclipse Year'. It was also decided to work on two fronts viz. popularizing the event of eclipse and also to explore the experimental aspect of the eclipse.

The awareness campaign was formally launched in December 1994. Various programmes such as lectures, slide shows and street plays were organised in schools, colleges, camps and housing colonies. Through these programmes people were exposed to reasons behind eclipse, scientific information about various phenomena occuring during eclipse and facts on the myths. To reach maximum number of people, Khagol Mandal also published a special monthly English bulletin named 'TOTALITY' from January 1995. Through Totality, articles and interviews of eminent solar scientists, thorough understanding of our parent star, the sun, various aspects of eclipse, possible experimentation during eclipse etc., were published.

From among the study circle members, the Experiment Group was formed. The group decided to conduct various simple experiments such as spectometry, measurement of variation in temperature, humidity and light, intensity wind speed, biological observations, medical experiments and photography as well as flash spectrum and coronal spectrum were prime targets of spectrometry. 22 photographers with their SLR cameras were trained and given the task of capturing the event at various focal lengths ranging from 50 mm to 2000 mm. Two video cameras were engaged to cover the complete celestial drama.

Around 450 members of Khagol Mandal joined the 'eclipse tour' to Hamirpur. Hamirpur is a small village town situated 67 kilometres south of Kanpur in Uttar Pradesh in Northern India and lying on the centre line of totality path. Khagol Mandal made three pilot trips to survey the site and to make necessary arrangements to accommodate all members. Hamirpur was the best possible compromise of maximum duration with clear skies. The duration of totality at Hamirpur was 59 seconds and probability of clear, cloudless sky was very high. Infrastructure and other facilities were satisfactory.

The group of 450 members reached Hamirpur on October 22. In the early morning of October 23, each member was taken to the observation site, two kilometres away from Hamirpur, for a mock drill of how to watch eclipse. Experiment group also rehearsed with their instrumental set-up.

The local response to eclipse was tremendous! Khagol Mandal distributed about 500 special goggles to the villagers who had gathered to observe solar eclipse from the said site.

On Tuesday, October 24, everyone gathered at the observing site. It was 6.30 in the morning and all were set for the event! Experiment group oriented their instruments and photographers prepared themselves with their camera sets. Sharp by 7.26 a.m. the moon took its first 'bite' and everyone rejoiced. The grand celestial show had began. The sky was crystal clear with no signs of clouds. As the Moon was slowly advancing to eclipse the sun, the surroundings started changing. By 8.30 a.m. almost 80% of the Sun's disc was covered and light intensity started falling considerably. Temperature also dropped. The experiment group was busy taking readings. Click, click, click .... photographers were clicking and capturing the partial phases.

Almost all the enthusiasts present were to watch the totality for the first time. So, inspite of knowing much about the sequence and the description, everyone was a bit anxious and eager to witness the great show. By 8.36 a.m. only a thin crescent was visible. After a moment or so, faint bands of shadows appeared on the ground. These shadow bands were so elusive that very few people noticed it. Suddenly, in the heaven, a diamond sparkled. At 8.36.54 a.m. the Sun was completely dark. The corona was stretched in the equatorial plane. Streamers were clearly visible. Lot of prominences and flares could be seen through the telescope. It was the most spectacular sight ever seen. Then came the second diamond ring with its classic effect. Shortly totality was over. Fourth contact took place at 9.58 a.m.

The spectrometry group, with one spectrograph and three spectrometers, tried to get a flash spectrum and a coronal spectrum. Unfortunately, due to excitement during totality, the group did not get any positive results. The temperature measurement group, with their digital and analogue ambient air temperature thermometers, measured average temperature drop of 4 degrees celsius during Totality.

To measure humidity during eclipse, dry and wet thermometers and hygrometers were used and the group found out that humidity dropped during first and second contact and again increased after third contact. Light intensity measurement group measured the light intensity

fall and rise during the eclipse. They used simple light dependent resister circuits with digital multimeters.

Anemometer was used to measure the wind speed during two and half hours of the eclipse. Our measurements showed erratic wind speed change. It was observed that wind speed was almost zero during totality and rose thereafter slowly.

Medical team measured the pulse rates and blood pressures of few subjects chosen randomly. A measurement of pupil/dilatation was also carried out. Though pulse rate and blood pressure of few subjects showed marked rise during totality, it was purely due to excitement. Pupil dilatation measurement showed decrease and increase in pupil size. This result can be compared with light intensity curve.

For biological observation, few saplings of Touch Me not, Office Time, Patua (local name) were brought to the site. Also on site were few shrubs and plants which are sensitive to light. Touch me Not plant leaflets were closed due to fall of light level. Other plants did not show such effect.

The group also brought few culture plates on which the growth of air-microspora was observed. The observation clearly indicated that the sedimentation and germination of fungal spores was at the lowest during the time of totality and was at highest level of growth after totality.

Though all these experiments were very preliminary with no new dramatic results expected, it was very enlightening doing these experiments. Our experimental set-ups were not very sophisticated. We also faced many problems in availing instruments due to lack of resources eventhough with the generous help of many individuals and institutes and with lots of efforts by our volunteers, experimentation was a great success.