

AN OVERVIEW OF THE 1999 TOTAL SOLAR ECLIPSE OBSERVATIONS IN YUGOSLAVIA

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The total solar eclipse of August 11, 1999 with the Moon's shadow path traversing the north part of Yugoslavia and several neighbouring countries (e.g., Hungary, Romania, Bulgaria) offered very good opportunities for us to send expeditions in the shadow track to locations that afforded good living conditions and very good positions in it (e.g., near the greatest eclipse point). In addition, total solar eclipses provide unique opportunities for studying the outer atmospheric layers of the Sun (chromosphere and corona), precise measurements of the relative positions of the Sun and Moon, and for examining the effects of transient abatement of the solar radiation on the characteristics of the Earth atmosphere, on the biosphere etc. In view of these opportunities a number of experiments were performed during the total solar eclipse of August 11, 1999. There were organized several expeditions in Yugoslavia and one in Bulgaria. The main observations activities were located in the vicinity of Horgoš, Kikinda, Subotica (Kelebia and Palić) and Djala in Yugoslavia and at Kamen Brjag in Bulgaria. In Belgrade and at Dobanovci, where the eclipse was only partial, observational parties were active too. The largest expedition, in terms of numbers, was that at Horgoš. There were positioned more than 30 scientists (astronomers, physicists, meteorologist, mathematicians) and about 40 amateurs. Horgoš was chosen by majority of observers because the duration of totality was longer (except Djala, where the totality was longer then in Horgoš by two seconds), and because of the better accommodation possibilities. The party at Kikinda counted more than 10 professional astronomers. On other places the number of professional observers was less than 10. Several days stay at observational sites was the period of hard work involving useful experiences in conditions more unfavorable than those at observatories and in laboratories. All of the participants worked each day from early morning till late at night executing the construction and adjusting the telescopes and other equipment. Fortunately for the preparatory works the skies were clear and our hope of success was high. The night before the eclipse, however, was cloudy all the night with a rough weather.

On the eclipse day in Yugoslavia, before the beginning of eclipse, the clouds were dense and it was raining. But from the north west (as we learned from Internet) a patch of blue sky was moving toward Yugoslavia, so that as the eclipse approached the sky conditions became better especially overhead of the parties in the west part of our country (at Subotica). Due to that fact there was an air of growing excitement

and the skies were anxiously watched. Unfortunately the sky conditions were bad during the eclipse along a path of totality in Yugoslavia, but excellent at Kamen Brjag in Bulgaria, where all planned experiments were carried out successfully. Thanks to holes in the cloudy sky at Subotica, Horgoš and western part of Kikinda, some good photographs of corona and objective prism observations of value were secured. Some planned observational programs were carried out as if the skies had been clear. At Subotica (parties at Kelebia and Palić and its vicinity) the clouds were so full of holes and thin at the totality that the diamond ring at both the second and third contacts as well as the corona were very well seen and the photographs showed splendid details. At Horgoš and on western part of Kikinda the holes in clouds did not interfere with the prominences but they cut down the fainter parts (especially the streamers) of the corona. The photographs of the Subotica and Kikinda parties are interesting with their a half dozen of prominences and a phenomenon at the west side of the corona, as if a prominence explosion had occurred. During the first part of the partial phase the clouds sometimes were just so thin (or thick), that the Sun was well visible and it was possible to safely observe the eclipse without solar filters. Nevertheless, thanks to the holes in the clouds at the majority of our stations photographs of the partial phase and the corona were taken in numbers of several tens even to hundreds. Probably it is of interest to mention two unusual phenomena, which were registered at our observational sites. First, on a photograph of the diamond ring at the second contact occurred an optical phenomenon, that sometimes could be seen, and looked like a large surge, as long as the solar diameter, directed almost tangentially to the solar limb from the diamond. Second, on the objective prism spectrograms taken even more than five minutes after totality, the Fraunhofer lines had been nicely recognized. During the totality the worst weather prevailed at Djala and in the east part of Kikinda where no observations were made.

Due to the bad sky conditions in Yugoslavia, only a few scientific experiments were successfully conducted. Among them were the experiments that did not need clear sky (e.g., meteorological, radio astronomical and radio wave propagation measurements) and those that were done during the partial phase of the eclipse. Unfortunately the most important astrophysical experiments, the high spectral and time resolution observations of the flash spectra at the second and third contact at Horgoš, ended without results due to clouds. If the eclipse had occurred only several minutes later the sky conditions would have been enough good for flash observations. As the end of eclipse approached, the clouds cleared away and the sky conditions became rather good. Thanks to that the partial phase observations during the second half of the eclipse went on very well.

The author, who was the coordinator of Yugoslav expeditions, hopes, we will hear about our results of solar eclipse observations in detail during this and future meetings or read about them in pertinent papers.