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CENTRAL BUREAU FOR ASTRONOMICAL TELEGRAMS

1993

229 *Circulars* were issued in 1993, down by almost 15 percent from each of the two preceding years but close to the average since 1987.

For 18 days beginning March 24 there was an average of two *Circulars* per day (with at least one issued every day). The principal reason for this was the appearance of supernova 1993J in NGC 3031 = M81, although this same time period also yielded the discovery of—among other things—the 'string-of-pearls' comet 1993e and the Kuiper-Belt candidate object 1993 FW. With 67 *Circulars* containing items on the M81 supernova, this has been the third most popular non-solar-system member ever discussed on the *Circulars*, following the LMC supernova 1987A (the 201 *Circulars* on which exceed by five those on the most popular comet, the "annual" P/Schwassmann-Wachmann 1) and the variable star R Coronae Borealis (with items on 72 *Circulars*).

The likelihood that comet 1993e had broken up—and brightened—as the result of an encounter with Jupiter and that it was actually in orbit around that planet was discussed within days of the comet's discovery, but the May 22 announcement that the next perijove would probably result in a collision was considered by some to be a hoax! Not until November 22, after it had finally been possible to compute orbits from absolute measurements of several of the individual nuclei, was it stated that collision was 'absolutely certain'.

In addition to 1993 FW (and the earlier 1992 QB_1), four more faint transneptunian objects, 1993 RO, RP, SB and SC, were announced in September. Despite urging at the time, no observations of the September quartet were reported in subsequent months, only circular orbits were computed, and some or all of them are thus likely now lost. This is very unfortunate, for it seems that these new objects may pass significantly closer to Neptune's orbit than the earlier discoveries do, and this has important ramifications for their orbital stability and the existence and estimated population of the supposed Kuiper Belt; some of the objects might be 'Trojans' of Neptune, for example.

The number of supernovae reported during the year, 36, was only half that of 1992, but there were again five new galactic novae. The Compton Gamma Ray Observatory and the GRANAT team discovered x-ray novae in Ophiuchus and Vela, both of which seem also to have been identified at optical and/or radio wavelengths. In addition to 1993e, nine other new comets were discovered during the year, there were 11 recoveries of short-period comets and an accidental rediscovery of P/Spitaler, which had orbited the sun 15 times since it was last seen at its discovery apparition in 1890-1891.

A sudden change in the Smithsonian Institution's policy meant that, starting October 1, the Central Bureau was forced to pay the postal charges for the *Circulars*. The very short notice also introduced a problem of logistics, in that for the remainder of the year stamps had manually to be affixed to the envelopes, and this has limited the number of *Circulars* in an envelope to five. In an emergency effort to increase income but to reduce the expenditure on postage, subscription charges for the printed version of the *Circulars* were increased by 12.5 percent and line charges by 16.7 percent. In a parallel effort to increase the revenue from the electronic version of the *Circulars*, the requirement that electronic subscribers also subscribe to the printed version was dropped, although the widespread piracy of the electronic copies remains a problem. E-mail subscribers are also entitled to use the log-in Computer Service, however, and recent improvements to this service now make it more attractive; several additional improvements are planned for early 1994. Furthermore, and in cooperation with the Minor Planet Center, some reduction in the number of *Circulars* issued was accomplished by inaugurating a series of *Minor Planet Electronic Circulars* and shifting to them the vast majority of the information on near-earth asteroids (and some occasional cometary information). As their title implies, these new *Circulars* are issued only in electronic form, and they are included in the Computer Service/e-mail subscription rate, which remains at $12.50 (invoiced) or $7.50 (non-invoiced) per month. During October-December the *IAU Circulars* were being issued at an annual rate of 164, which is still higher than for any year prior to 1987. Finally, in a rather momentous but not unexpected decision on September 30, the Bureau discontinued its telegram service. Only one 'telegram book' had been issued during the year (on January 5), and the decision to stop this service was made after a March 30 enquiry yielded only one request that it continue—from a U.S. amateur who was receiving the telegrams only by slow mailgram anyway! For the sake of tradition, the Bureau does not propose now to change its name (and neither does Commission 6)!

Although the number of subscribers to the printed *Circulars* generally increased from 701 in January to 721 in September, the actions outlined in the previous paragraph resulted in a decrease to 665 in October and to 626 in December, essentially confirming the estimate that the number will level off around 600. In contrast, and also much as expected, the number of subscribers to the Computer Service showed a moderate steady increase from 225 in January to 255 in September, then jumping to 275 in October and 290 in December. Early in 1994 the number of electronic subscribers exceeded half that of subscribers to the printed version.

Most of the *Circulars* were prepared by Associate Director Daniel W. E. Green, while Gareth V. Williams provided assistance with proof-reading and orbit computations. In addition to her other duties as Administrator for the Planetary Sciences Division of the Harvard-Smithsonian Center for Astrohysics, Donna Thompson served as the Bureau's chief administrative assistant, although extensive administrative work was also carried out part-time by Muazzez Lohmiller.

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Director of the Bureau