SOME POSSIBLE IDENTIFICATION BETWEEN CHINESE GUEST STARS AND SUPERNOVA REMNENTS

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There are a lot of records concerning ancient Guest Stars (AGS) in Chinese historical books. Two catalogues of ancient nova or supernova were compiled (Xi 1955, Xi and Bo 1965, 1966) that listed 90 probable nova or supernova observed between 14 BC and 17 AD. The identity of AD. 1054 Guest star with Crab Nebula proved that the historical records are valuable to astrophysics. Since the discovery of the Crab pulsar in 1967, much attention has been paid to the relation between AGS and supernova remnants (SNR). Eight pairs of identification were suggested by Clark and Stephenson (1977). The number of SNR identified is two few to compare with the expectation from the frequency of supernova. In fact a lot of SNR or AGS have not been identified. It seems necessary, important and possible to look for further identification.

For an event of supernova explosion, it should be described by the place where it occured and the time when it occured. A reliable identification should be made on the basis of agreement in visual position, distance and age between AGS and SNR. Let us first discuss the visual position. Visual position is exactly known for a known SNR, but is only approximately known for a AGS (e. g. Lunar Mansion, Yuan or some other Chinese Asterisms). Agreement in visual position means that the visual position of SNR is in the region described for an AGS by the ancient records. As to the agreement in distance, we use the wellknown relation

$$M = m + 5 - 5 \log d - A_V \qquad (1)$$

to an AGS at its ancient observed time. Obviously, m was its visual magnitude, probably around its maximum luminosity, and could be estimated for an AGS from its ancient records. d and A_V should be its distance and absorption correction. It is sure that the ancient people could not know about their distance and absorption. But we can get them from its possible candidate of identified SNR. Usually, d can be obtained from the neutral hydrogen observation or other method and A_V can be got from the following relation (Gorenstein 1975)

$$A_V = 4.5 \times 10^{-22} \; N_H \quad (\text{mag}) \qquad (2)$$

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or

$$A_V = 3.0\ E(B-V)$$

where N_H is the column density of neutral hydrogen, E(B-V) is the colour excess. If the value of absolute magnitude M obtained from eq.(1) is approximately satisfied with the following relation (Trimble 1982)

$$M \simeq -18^m \pm 2^m.5, \qquad (4)$$

the agreement in distance is set up. Finally we discuss the agreement in age-- t. t is known for an AGS, and we can get t for a SNR from its observed size and spectrum. We demand the age of both SNR and AGS is almost the same for a reliable identification, or we demand a reasonable velocity for a SNR from its size and the age of its AGS.

By use of the above principal of identification to $\sim$90 AGS(Xi and Bo 1965) and $\sim$ 130 SNR (Van den Bergh 1983), seven pairs of identification have been found including CTB 80 that was identified before by Wang and seward (1984)

TABLE 1 Seven Pairs of Identification Between AGS and SNR

AGS	SNR	Records
AD 1523	G 29.7-0.3(Kes 75)	Chinese
AD 125	G 31.9+0.0(3C 391)	Chinese
BC 134	G 332.4-0.4(RCW 103)	Chinese, Greece
AD 421	G 292.0+1.8(MSH 11-54)	Chinese
BC 48	G 21.5-0.9	Chinese
BC 523	G 74.9+1.2(CTB 87)	Chinese
AD 1408	G 68.2+2.6(CTB 80)	Chinese, Japan

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