

CHAPTER III
RESULTS & CONCLUSION



The frequency distribution of stars shown in Table II, III, IV and V were plotted as shown in Fig III, IV, V and VI having the peaks at three prong stars. These are similar to the results of earlier workers such as Brown et al (19), Page (20) and of C. Dharmaphanija and T. Suttipongse (21).

These results show that the great part of cosmic rays at altitude below 2,595 m. level are almost of low energies.

The logarithmic plot of size distributions of star at Doi Intanone 2,595 m. altitude, Doi Suthep 1,650 m. and Suan Dok 313 m. are shown in Fig VII, VIII and IX respectively.

From Table VI, we plot the altitude variations of stars as shown in Fig X, XI and XII. We can conclude that the numbers of stars more than 4 prongs per star increase with increasing altitude, while the numbers of stars less than 4 prongs decrease with altitude.

At ^{Wat} Suan Dok altitude 313 m. our results also show significantly a very small number of ~~was~~ high energy stars. The rate of production of stars greater than 5 prongs is 0.118 ± 0.03 stars per c.c. per day. This is due to the magnetic field of the earth which prevents charged particles of energy lower than a certain limit from reaching the earth. Another reason is very few energetic particles from the upper level can reach the earth's surface because

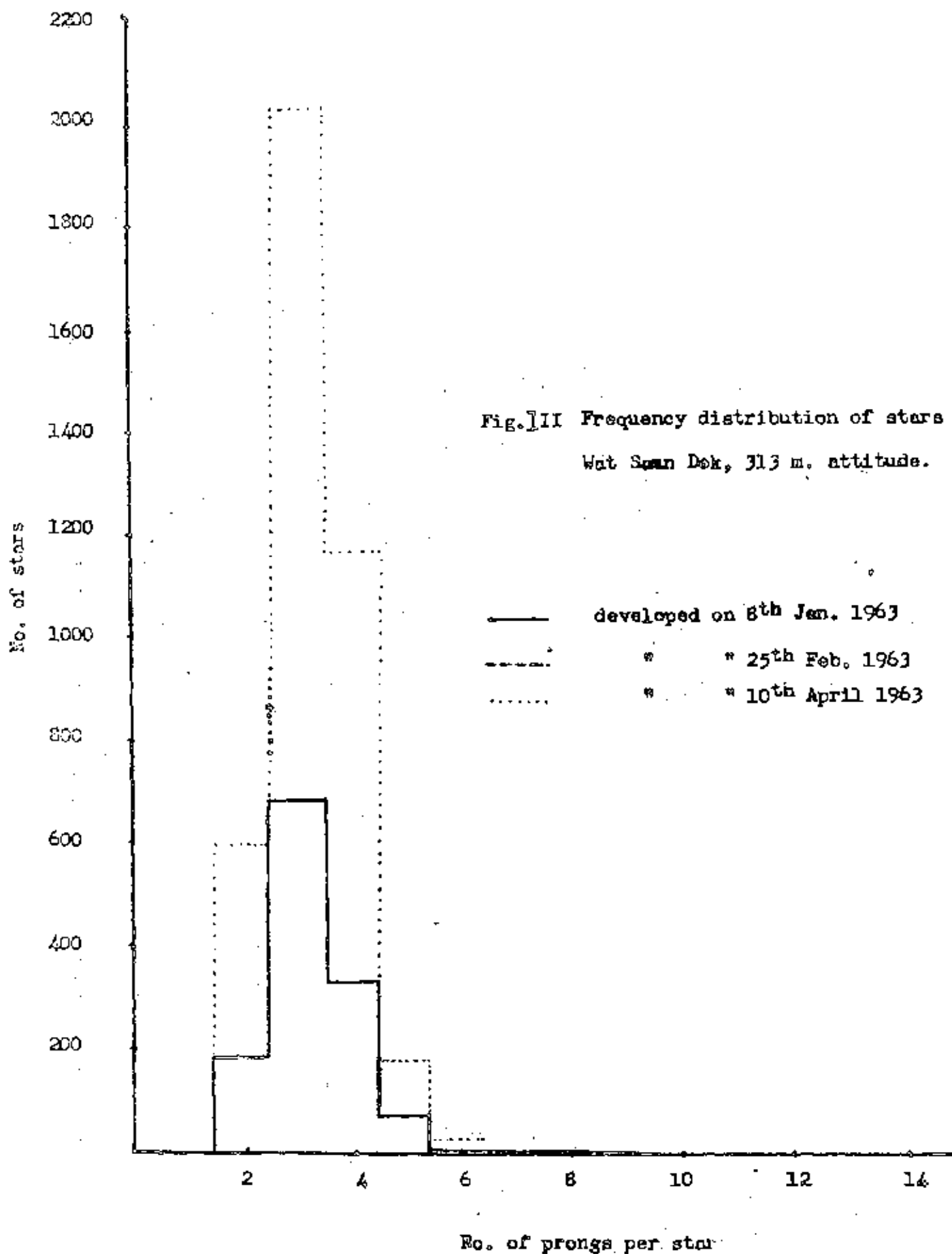
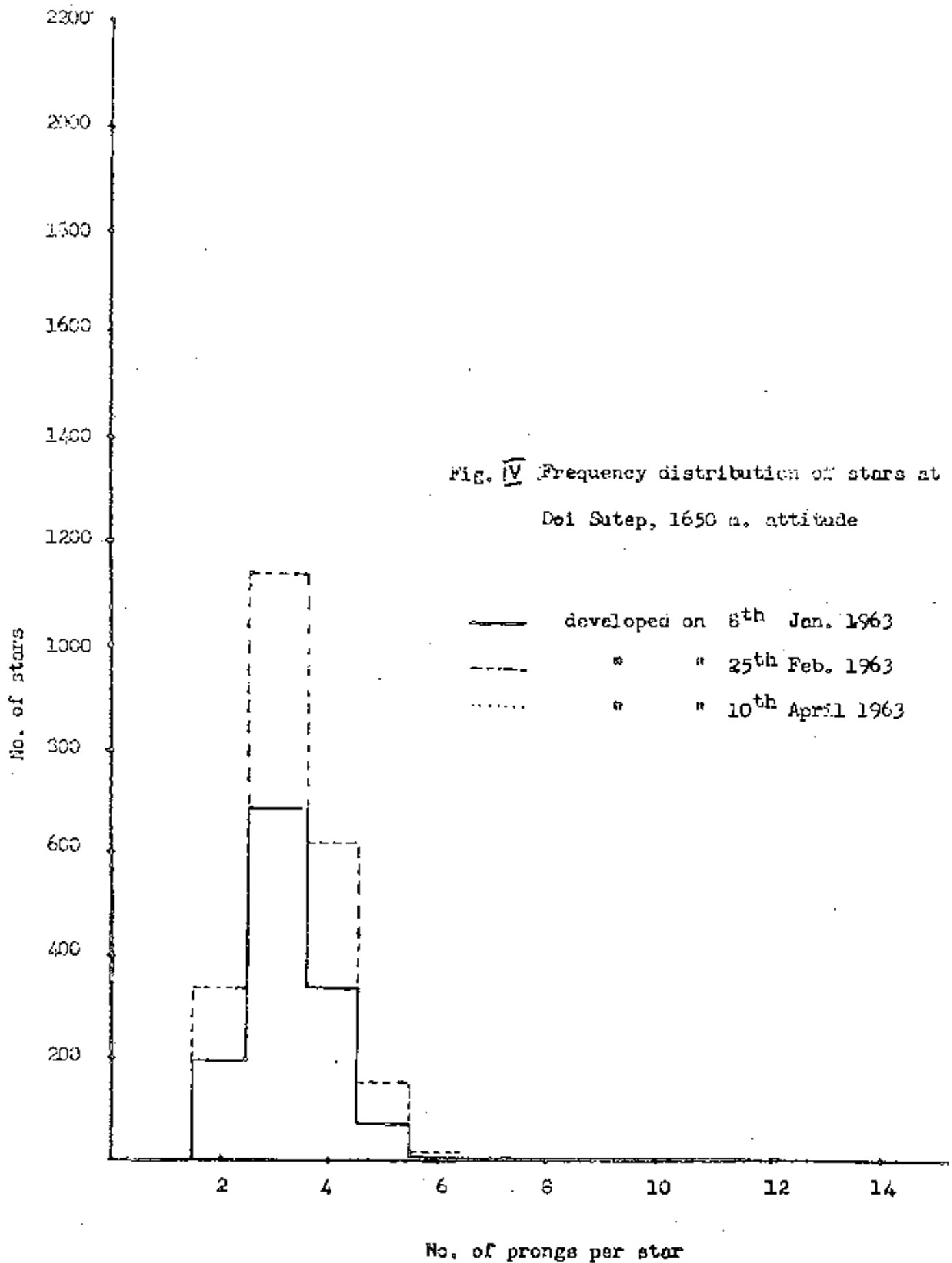


Fig. III Frequency distribution of stars at Wat Suan Dok, 313 m. altitude.

— developed on 8th Jan. 1963
 - - - " " 25th Feb. 1963
 " " 10th April 1963



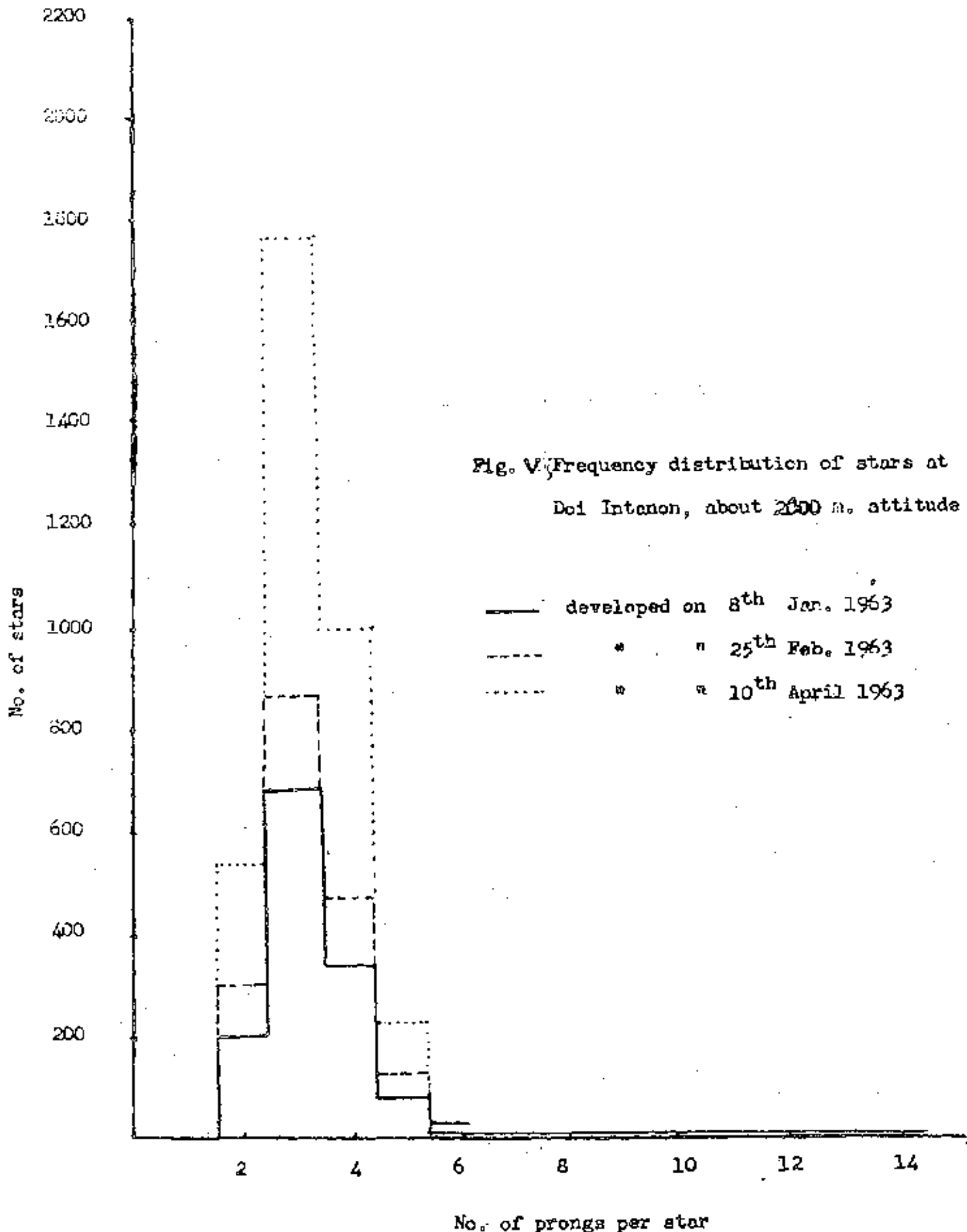


Fig. V. Frequency distribution of stars at Doi Intanon, about 2000 m. altitude

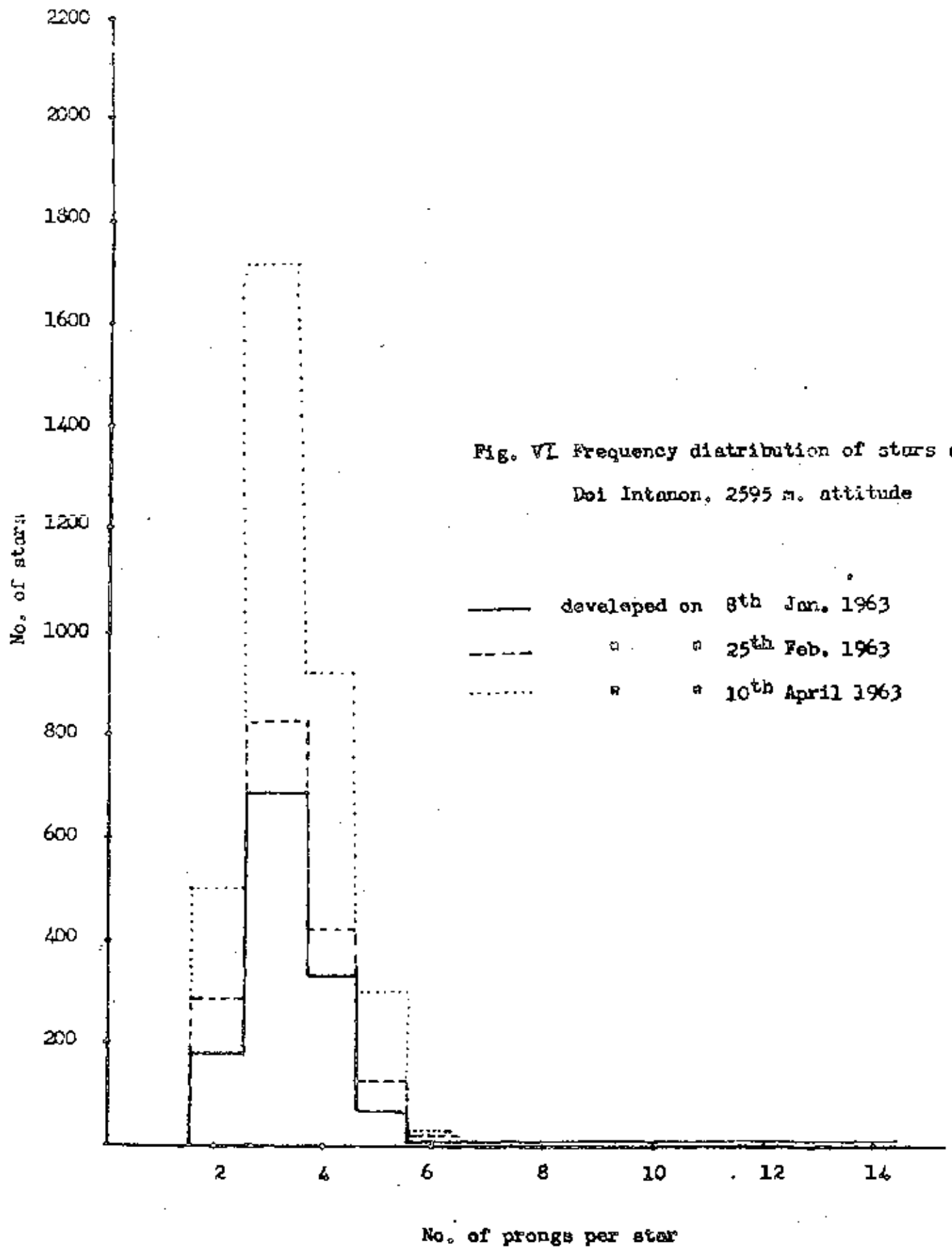


Fig VII Size distribution of stars at
Doi Intanone, 2,595 m.

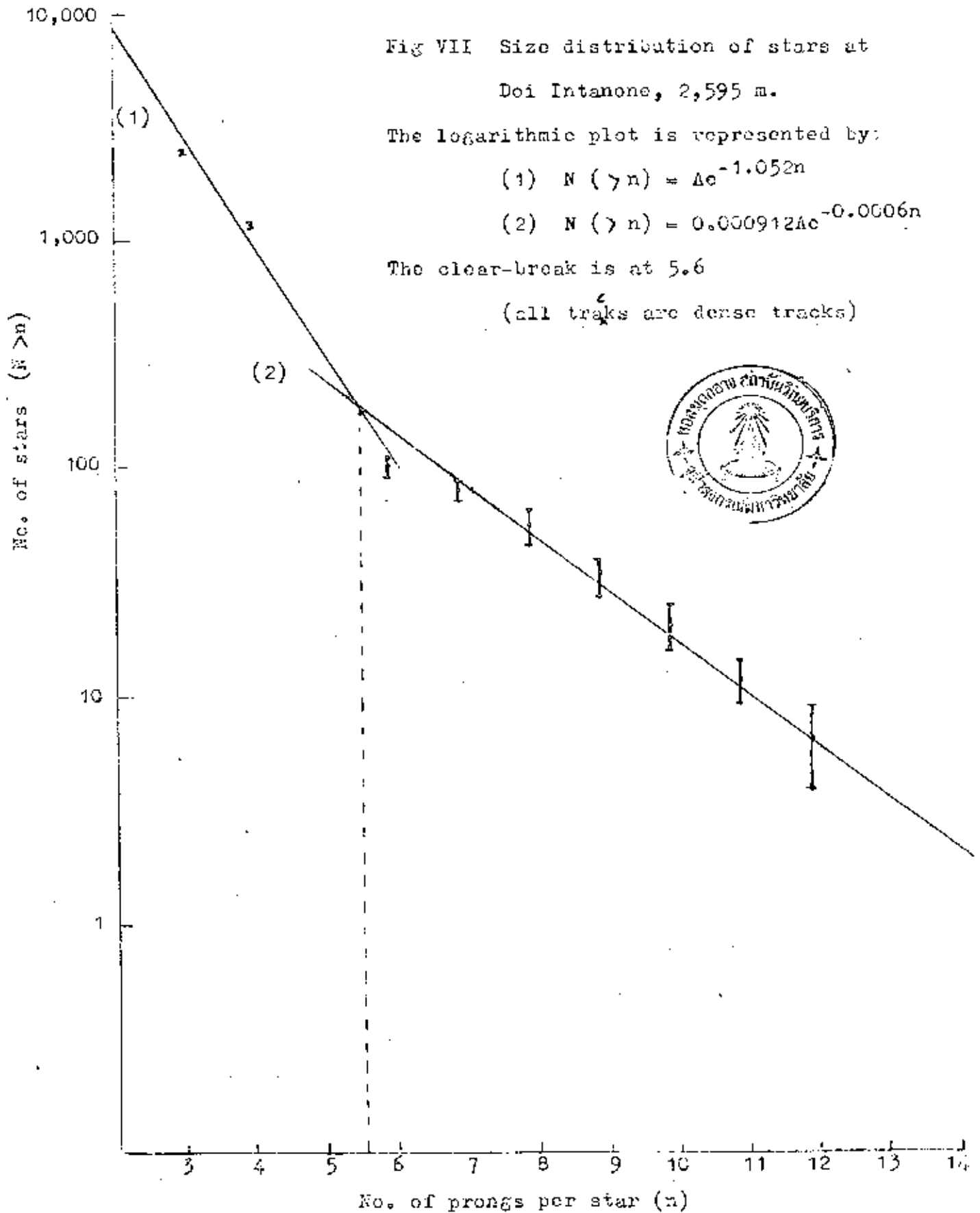
The logarithmic plot is represented by:

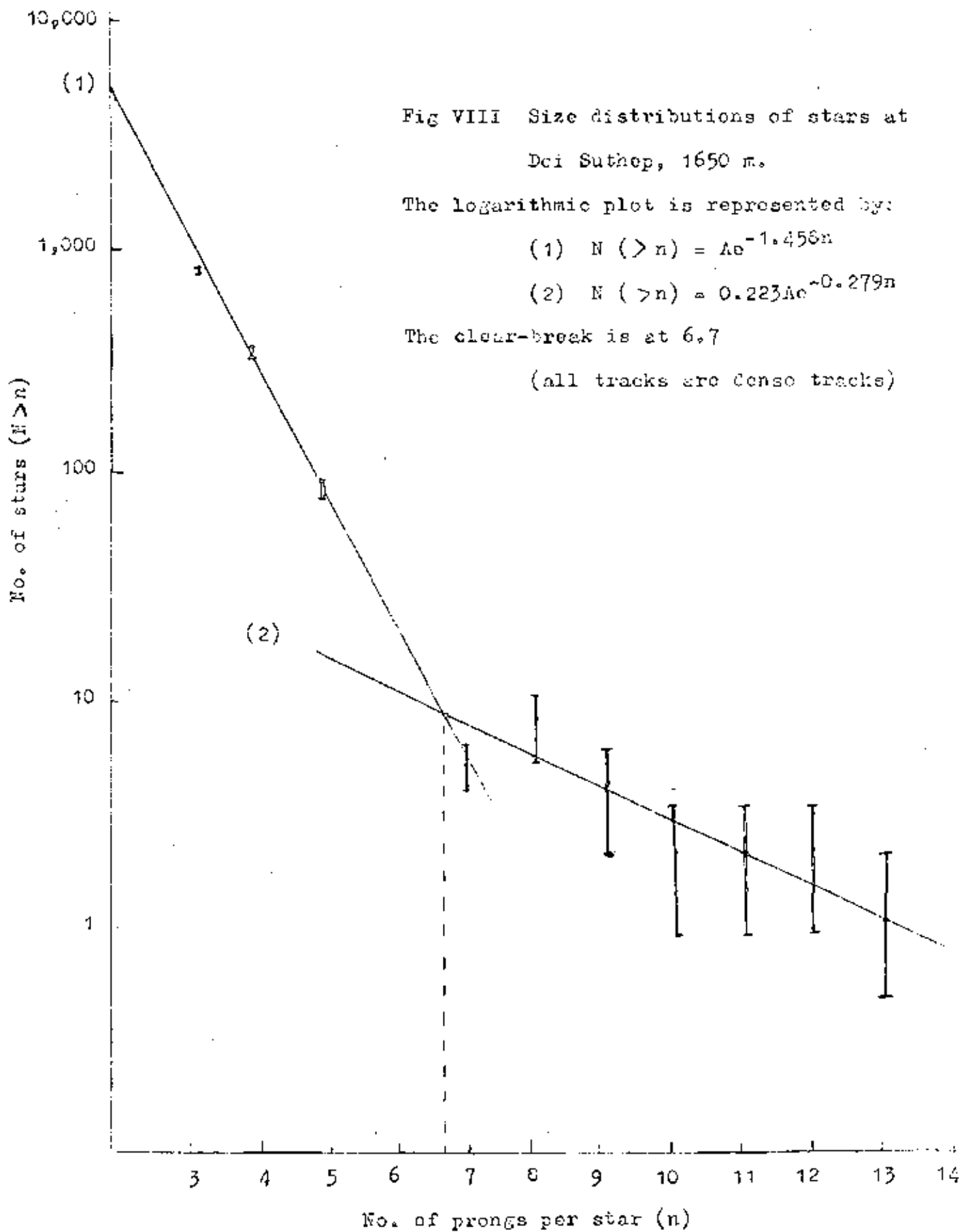
$$(1) N (> n) = \Delta e^{-1.052n}$$

$$(2) N (> n) = 0.000912 \Delta e^{-0.0606n}$$

The clear-break is at 5.6

(all tracks are dense tracks)





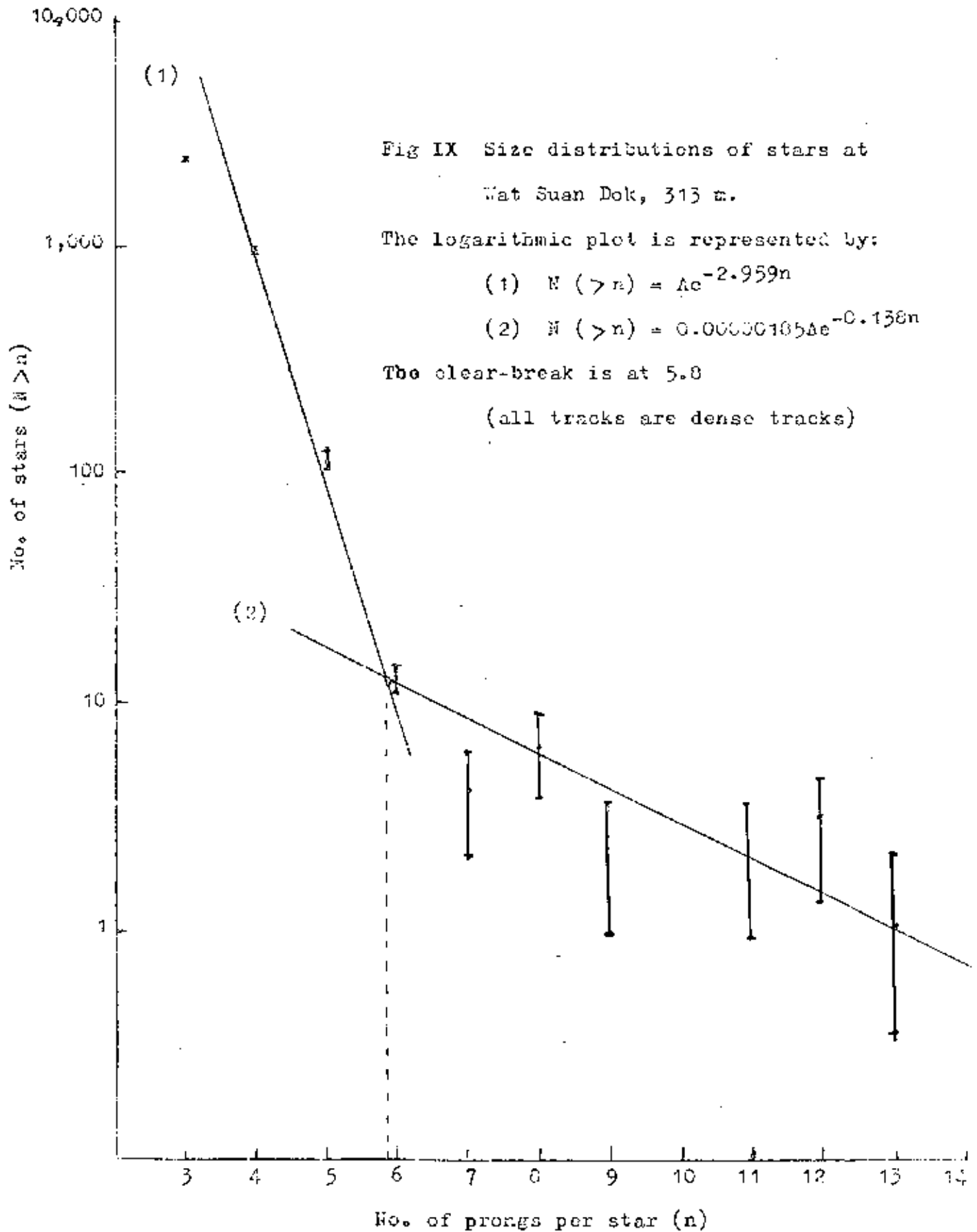


Fig X Altitude variations of stars.

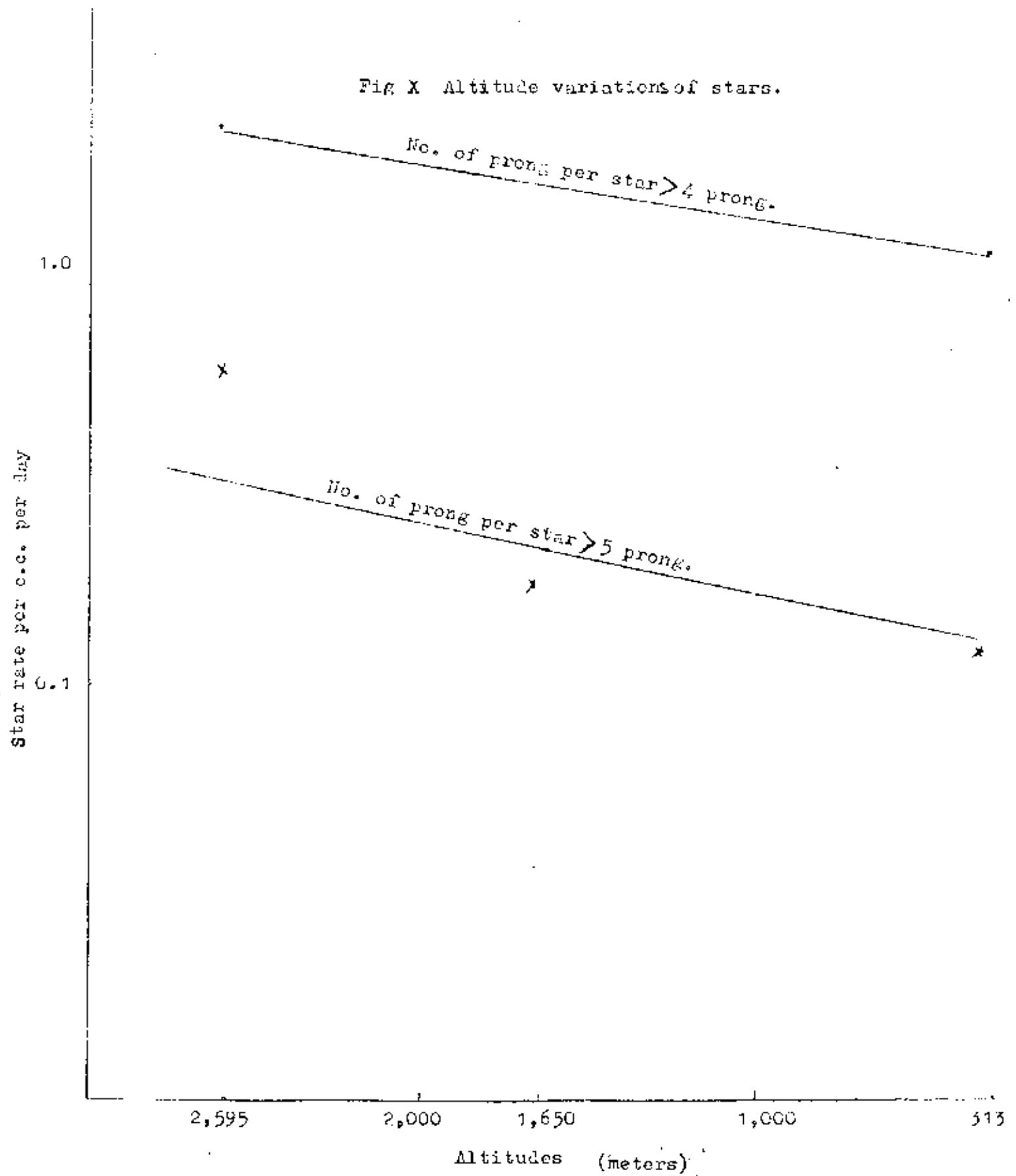


Fig XI Altitude variation of star.

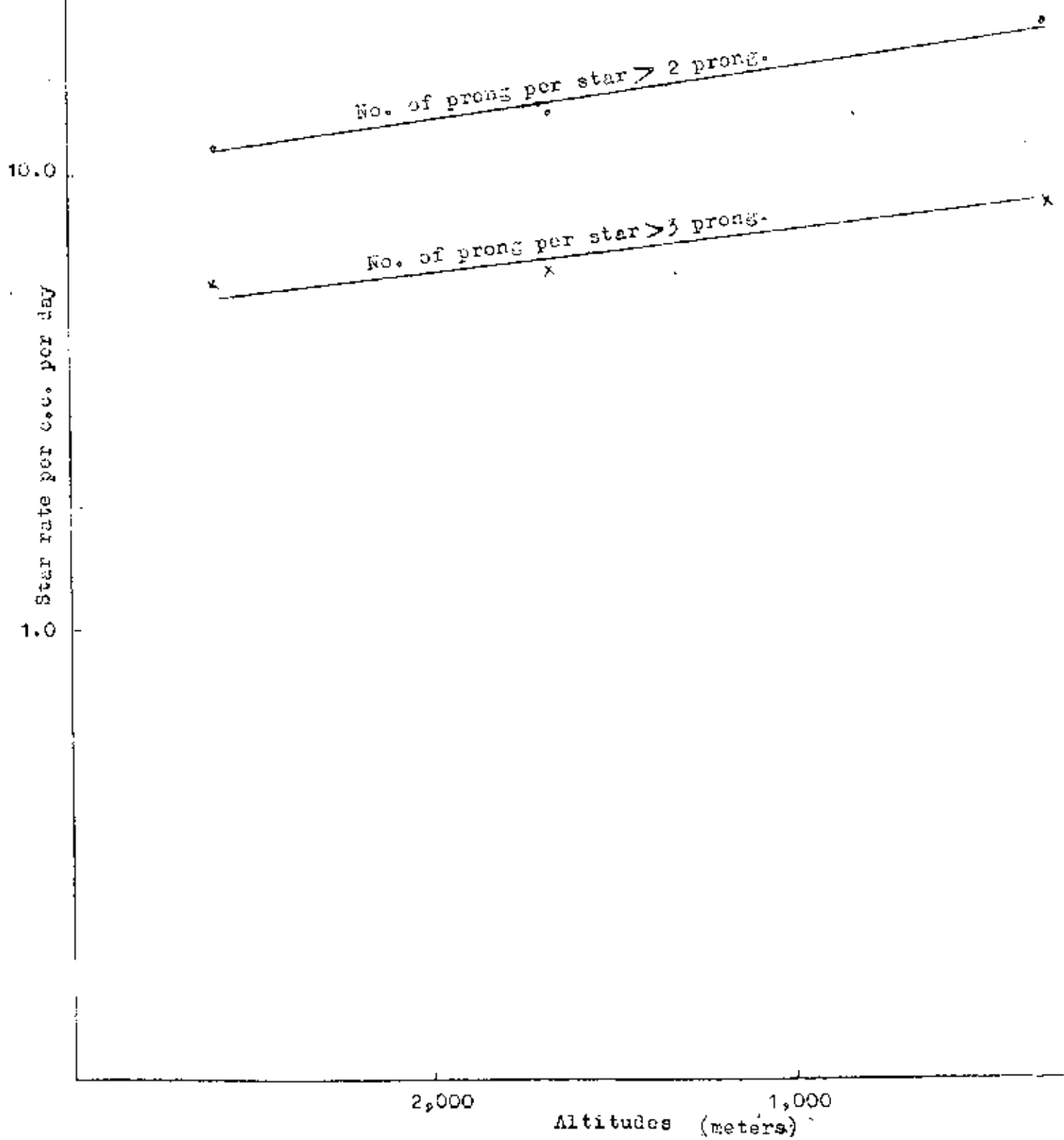
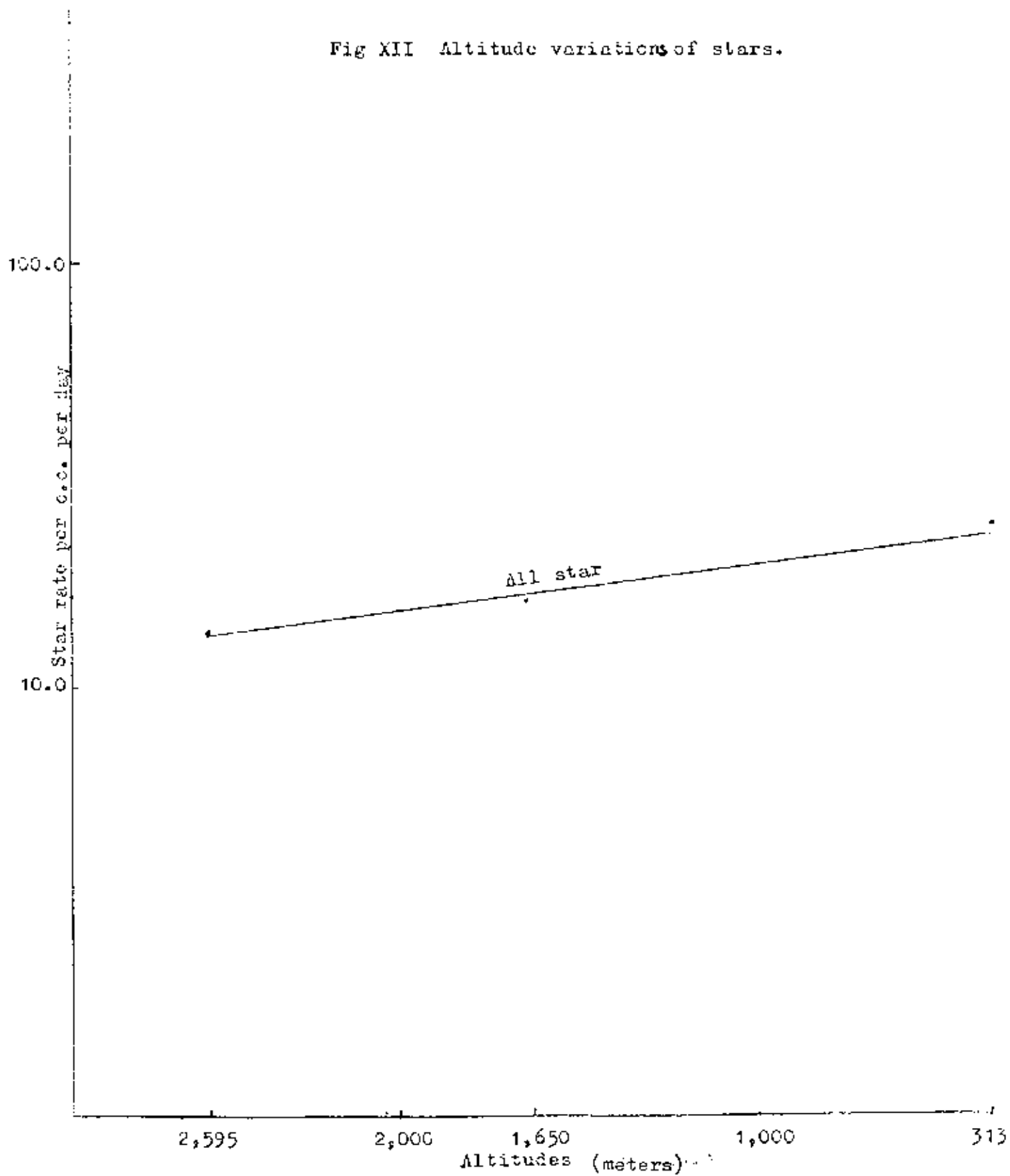


Fig XII Altitude variations of stars.



of the greater depth of absorption, and the ionizing particles such as charged mesons and protons lose energy at much greater rate than neutral particles as shown by Brown et al (19) and Page (20.)

From the above results the following conclusions may be made:

- a. Total rate of production of stars at Wat Suan Dok is 24.41 ± 0.47 stars per c.c. per day, and the rate of production of stars > 2 prongs is 20.1 ± 0.40 stars /c.c./ day in Ilford G5 emulsion 300 microns thick.
- b. The total rate of production of stars at Doi Suthep is 16.21 ± 0.523 stars /c.c. / day and the rate of production of stars > 2 prongs is 13.62 ± 0.48 stars /c.c./day.
- c. The total rate of production of stars near the peak of Doi Intanone of altitude about 2,000 m. is 14.16 ± 0.56 stars /c.c./ day and of altitude 2,595 m. is 13.78 ± 0.55 stars /c.c./day and the rate of production of stars > 2 prongs are 11.71 ± 0.51 stars /c.c./day, and 11.45 ± 0.50 stars / c.c. / day.
- d. The rate of production of stars > 5 prongs at Wat Suan Dok of altitude 313 m. is 0.118 ± 0.03 stars /c.c./day compare to 0.11 ± 0.04 stars /c.c./day of C.Dharmaphanija and T.Suttipongse (21) at ground level at latitude $13^{\circ} 46' N$. The rate of production of star > 5 prong at Doi Suthep and Doi Intanone are 0.17 ± 0.05 stars /c.c./day and 0.56 ± 0.11 stars per c.c. per day respectively.

This shows that the number of high energy stars increase with increasing altitudes.

e. The logarithmic plots of size distributions against star size consists of two straight lines with a clear break at approximately 6. The results are in agreement with Le Counter extension theory. These results can be represented by the following equations.

$$\begin{aligned} \text{Wat Suan Dok, } N (>n) &= A_0 e^{-2.959n} \\ N (>n) &= 0.00000185 A_0 e^{-0.138n} \\ \text{Doi Suthep, } N (>n) &= A_0 e^{-1.458n} \\ N (>n) &= 0.223 A_0 e^{-0.279n} \\ \text{Doi Intanone, } N (>n) &= A_0 e^{-1.052n} \\ N (>n) &= 0.000912 A_0 e^{-0.0006n} \end{aligned}$$

f. From the altitude variation of stars plotted, it was found that the total number of stars, the numbers of stars less than 4 prongs decrease with altitudes while the number of stars greater than 4 prongs increases with altitude.

It was also found that, contrary to general belief, the total number of stars, the number of stars greater than two prongs, and the number of stars greater than three prongs decrease with altitudes. Only the number of stars greater than 4 prongs and the number of stars greater than 5 prongs increase with altitude.