

**Note on the After-shocks of the Mino-Owari  
Earthquake of Oct. 28th 1891.**

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The mean time-variation of the frequency of after-shocks of earthquakes may generally be represented by means of a rectangular hyperbola.\* Thus, denoting by  $x$  the time and by  $y$  the corresponding frequency of after-shocks, we have the following relation :

$$y = \frac{k}{h+x}, \quad (1)$$

in which  $k$  and  $h$  are constants to be properly determined for each case.

The Mino-Owari earthquake took place on Oct. 28th 1891, at 6h 37m a.m. (Gifu). Taking the semi-daily earthquake numbers observed instrumentally at the Gifu Meteorological Observatory during the *five days* between Oct. 29th and Nov. 2nd, 1891, and calculating by the method of Least Squares, equation (1) assumes the form

$$y = \frac{440.7}{x+2.314}, \quad (2)$$

in which  $y$  denotes the number of earthquakes observed at Gifu during the 12 hours denoted by  $x$ ; the time origin, expressed by  $x=0$ , corresponding to the first half of the 29th of Oct. 1891.

Equation (2) is the same as that which I have given in 1894.† As now more than 8 years have elapsed since the time of the great earth-

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\* See the present Author's papers: *On the after-shocks of earthquakes*, Jour. Sc. Coll., Imp., Univ. Vol. VII; *Note on the after-shocks of the Hokkaido earthquake of March 22nd 1894*, Publ. Earthq. Invest. Committee, No. 4; *Nota sulle repliche del gran terremoto giapponese del 1854*, Boll. d. Soc. Sism. Ital. Vol. I.

† See Jour. Sc. Coll., Imp. Univ. Tokyo., Vol. VII.

quake, I shall here test the accuracy of the above equation by calculating the numbers of the earthquakes at Gifu for 1898 and 1899 and by comparing the results so obtained with the numbers of the earthquakes actually observed there during the same two years.

The middle  $\frac{1}{2}$ -day of the year 1898 corresponds to

$$x = x_1 = 4876,$$

while the middle  $\frac{1}{2}$ -day of the year 1899 corresponds to

$$x = x_2 = 5606.$$

If  $y_1$  and  $y_2$  be the after-shock frequencies corresponding respectively to  $x_1$  and  $x_2$ , we obtain from equation (2)

$$y_1 = 0.0905$$

$$y_2 = 0.078.$$

Denoting by  $n_1'$  and  $n_2'$  the theoretical total numbers of *after-shocks* at Gifu for the two years, we may approximately put

$$n_1' = 365 \times 2 \times 0.0905 = 66,$$

$$n_2' = 365 \times 2 \times 0.078 = 57.$$

Now it is to be remarked that equation (2) has been deduced simply from the observations at Gifu during the first 5 days and is not affected by *ordinary* earthquakes or those which are not after-shocks of the Mino-Owari earthquake. Hence, if  $n_1$  and  $n_2$  be the theoretical numbers of all the *earthquakes* at Gifu during the two years under consideration, we have

$$n_1 = n_1' + m, \quad (3)$$

$$\text{and } n_2 = n_2' + m,$$

where  $m$  is the mean annual frequency of earthquakes at Gifu in *ordinary years*, and may be taken as being equal to 18.3, as follows:—

Year	Number of eqkes.
1888.....	20
1889.....	19
1890.....	16
Mean.....	18.3

We obtain therefore

$$n_1 = 66 + 18.3 = 84,$$

$$n_2 = 57 + 18.3 = 75;$$

accordingly

$$n_1 + n_2 = 160.$$

Actually there were observed at Gifu, in 1898 and 1899, 101 and 62 earthquakes respectively, or 163 during the two years. These numbers agree with the calculated results as closely as possible; equation (2) being thus proved to be highly accurate. The monthly earthquake numbers at Gifu between Oct. 1891 and Dec. 1899 are given in the following table.

MONTHLY EARTHQUAKE NUMBER AT GIFU.

(Oct. 28th 1891 to Dec. 31st 1891.)

Month Year.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	Sum
1891										720	1086	421	2227
1892	164	114	87	90	54	30	35	52	107	47	48	39	867
1893	31	20	52	59	32	12	18	13	20	19	16	16	308
1894	62	14	19	8	5	16	19	19	12	6	29	20	229
1895	21	17	10	24	19	18	8	10	14	18	6	7	172
1896	12	9	4	9	4	14	17	10	10	9	7	13	118
1897	22	15	11	6	20	7	2	7	8	9	22	8	137
1898	6	6	9	15	6	9	5	6	5	13	16	5	101
1899	4	7	3	12	2	2	4	3	1	5	10	9	62

Numbers of earthquakes during the successive 12 months :—

Nov. 1891 — Oct. 1892.....	2287
„ 1892 — „ 1893.....	363
„ 1893 — „ 1894.....	212
„ 1894 — „ 1895.....	208
„ 1895 — „ 1886.....	111
„ 1896 — „ 1897.....	127
„ 1897 — „ 1898.....	110
„ 1898 — „ 1899.....	64

*Space variation of after-shock frequency.* The Mino-Owari earthquake was most violent in the Néo-valley, whence the epifocal zone, marked out by faults, depressions and shears of the ground, extended on the

south to the villages of Takatomi and Higashi-Katabira in the eastern part of Mino, and on the north to the villages of Nukumi and Kumanoko in the province of Echizen.\* The most active centre of the *after-shocks*, however, was not in the Néo-valley itself, but was situated in the Mino-Owari plain to the west of Gifu.

The space variations of after-shock frequency for the two months of November and December, 1891, are shown respectively in Fig. 2 and Fig. 3, where the red curves are the iso-frequency curves. Thus, for instance, the curve marked 10 in Fig. 2 connects those places where ten earthquakes were observed during November 1891. In Fig. 2, there are six curves corresponding to the earthquake numbers 5, 10, 20, 50, 100 and 200; while in Fig. 3 there are three curves corresponding to the numbers 5, 20 and 50. The curves are based on the original earthquake reports collected by the Central Meteorological Observatory and refer to the total monthly numbers of earthquakes observed at the various places, including also some which were not after-shocks. These latter are, however, very few in number and may be neglected in comparison to the great number of the after-shocks.

*Fig. 2.* The iso-frequency curve (200), which includes the most active centre of the after-shocks, extends over the Mino-Owari plain, a portion of the eastern part of Mino and the north-western corner of Mikawa, the average radius of the curve being about 40 km. The form of the iso-frequency curve (200) is somewhat irregular, but the curves (100)—(10) are regular in form and become more nearly circular as their radial distances increase; the point C, which is approximately at their common centre, being situated immediately to the west of Gifu and coinciding with the most active centre of the after-shocks as already referred to. The eccentricity of the point C with respect to the iso-frequency curve (200) indicates that the after-shocks originated from

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\* See prof. B. Koto's memoir, *Cause of the great earthquake in Central Japan, Oct. 28, 1891* Jour. Sc. Coll., Imp. Univ. Tokyo, Vol. V; and my *Note on the great Mino-Owari earthquake*, Publ. Earthq. Invest. Committee, No. 4.

the different parts within the curve, while the strongest among them originated at the point C.

The after-shock frequency decreased rapidly with the increase of the radial distance as will be seen from the following table, which gives the mean radii of the iso-frequency curves (100)–(5) directly measured from the map.

Iso-frequency curve of	Mean surface radius of iso-frequency curve.	Mean radius of iso-frequency curve = $r$ .	Value of $y$ , calculated from equation (4)
100 eqkes	78 km	80 km	111
50	113	115	48
20	160	161	16
10	180	181	10
5	200	201	6

To consider rigorously the space variation of after-shock frequency ( $=y$ ), given in the 2nd column of the above table, it is necessary to determine the depth, or mean depth, of the seismic focus and find out the distances of the iso-frequency curves from the latter. Now, inferring from the intensity distribution in the meizoseismal area, the mean focal depth of the Mino-Owari earthquake seems not to exceed about 20 km. The numbers represented by  $r$ , in the 4 column, are the mean radii of the iso-frequency curves obtained under the supposition that the mean focal depth was 20 km. In this case, however, there is no marked difference between the surface radii and  $r$  thus found.

The relation between  $y$  and  $r$  is graphically shown in Fig. 4, which may approximately be represented by the equation

$$\log y = 2.89 - r \times 0.0105 \quad (4)$$

In Fig. 3, which indicates characters similar to Fig. 2, the iso-frequency curve (50) is irregular in form; but the other two curves are more or less circular, with their centres approximately at the point marked C'.

*Appendix. Earthquakes observed at Nemuro.*

The following table is a list of the after shocks of the Hokkaido Earthquake of march 22nd 1894, instrumentally observed at the meteorological Observatory of Nemuro, between the above date and Dec. 31st 1900. A short note on these after-shocks has been given in the *Publ. Earthq. Invest. Committee*, No. 4.

## EARTHQUAKES OBSERVED AT NEMURO.

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
22 III, 1894.	7. 56. 06. pm.	Weak.	22 III, 1894.	9. 58. 00. pm.	Weak.
" " "	8. 01. 30 "	"	" " "	10. 00. 00. "	"
" " "	8. 12. 00 "	"	" " "	10. 05. 00 "	Slight.
" " "	8. 16. 00 "	"	" " "	10. 11. 05 "	"
" " "	8. 17. 00 "	"	" " "	10. 15. 30 "	Weak.
" " "	8. 20. 00 "	"	" " "	10. 21. 30 "	Slight.
" " "	8. 22. 12 "	"	" " "	10. 51. 46 "	Weak.
" " "	8. 30. 35 "	"	" " "	10. 53. 05 "	"
" " "	8. 31. 08 "	"	" " "	11. 00. 10 "	"
" " "	8. 35. 00 "	"	" " "	11. 09. 00 "	"
" " "	8. 43. 51 "	"	" " "	11. 13. 00 "	"
" " "	8. 44. 52 "	"	" " "	11. 14. 00 "	"
" " "	8. 47. 20 "	"	" " "	11. 17. 00 "	"
" " "	8. 53. 22 "	Strong.	" " "	11. 19. 20 "	"
" " "	8. 56. 57 "	Slight.	" " "	11. 26. 02 "	"
" " "	8. 57. 48 "	Weak.	" " "	11. 34. 30 "	Slight.
" " "	8. 58. 15 "	Slight.	" " "	11. 45. 00 "	"
" " "	9. 09. 32 "	Weak.	" " "	11. 48. 00 "	"
" " "	9. 13. 25 "	"	" " "	11. 50. 00 "	"
" " "	9. 17. 30 "	"	" " "	11. 55. 03 "	"
" " "	9. 19. 25 "	"	" " "	11. 59. 03 "	"
" " "	9. 20. 50 "	"	23 " "	0. 19. 00 am	Weak.
" " "	9. 22. 30 "	"	" " "	0. 31. 45 "	Slight.
" " "	9. 23. 45 "	"	" " "	0. 40. 20 "	Weak.
" " "	9. 28. 10 "	"	" " "	0. 51. 30 "	"
" " "	9. 37. 20 "	"	" " "	0. 55. 44 "	"
" " "	9. 40. 15 "	"	" " "	0. 56. 04 "	"
" " "	9. 44. 00 "	"	" " "	1. 10. 00 "	"
" " "	9. 50. 51 "	Slight.	" " "	1. 19. 14 "	Slight.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
23 III, 1894.	1. 22. 30. am.	Weak.	23 III, 1894.	4. 36. 00. am.	Slight.
" " "	1. 38. 23 "	Slight.	" " "	4. 39. 24 "	Weak.
" " "	2. 07. 36 "	Weak.	" " "	4. 41. 56 "	Slight.
" " "	2. 15. 05 "	Slight.	" " "	4. 54. 40 "	Weak.
" " "	2. 24. 22 "	Strong.	" " "	5. 00. 25 "	"
" " "	2. 52. 10 "	Slight.	" " "	5. 08. 28 "	Slight.
" " "	3. 04. 20 "	Weak.	" " "	5. 14. 40 "	"
" " "	3. 14. 00 "	Slight.	" " "	5. 25. 50 "	"
" " "	3. 15. 50 "	"	" " "	5. 37. 10 "	"
" " "	3. 31. 25 "	"	" " "	5. 38. 17 "	"
" " "	3. 35. 00 "	"	" " "	5. 42. 58 "	"
" " "	3. 36. 10 "	"	" " "	5. 44. 46 "	"
" " "	3. 44. 00 "	"	" " "	5. 54. 06 "	"
" " "	3. 46. 05 "	"	" " "	5. 57. 00 "	"
" " "	3. 47. 20 "	Weak.	" " "	6. 16. 20 "	"
" " "	3. 51. 30 "	Slight.	" " "	6. 23. 58 "	"
" " "	3. 54. 00 "	"	" " "	6. 25. 55 "	"
" " "	3. 59. 25 "	"	" " "	6. 27. "	"
" " "	4. 00. 10 "	"	" " "	6. 28. 20 "	"
" " "	4. 00. 50 "	"	" " "	6. 37. 32 "	"
" " "	4. 03. 20 "	Weak.	" " "	6. 43. 50 "	"
" " "	4. 04. 20 "	Slight.	" " "	7. 19. 50 "	"
" " "	4. 07. 00 "	"	" " "	7. 28. 20 "	"
" " "	4. 07. 35 "	Weak.	" " "	7. 31. 45 "	"
" " "	4. 10. 50 "	Slight.	" " "	7. 45. 50 "	"
" " "	4. 15. 42 "	Weak.	" " "	8. 02. 00 "	"
" " "	4. 20. 44 "	Slight.	" " "	8. 02. 10 "	"
" " "	4. 27. 30 "	"	" " "	8. 12. 05 "	"
" " "	4. 28. 33 "	"	" " "	8. 21. 30 "	"



## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
23 III, 1894.	8. 34. 40. am.	Slight.	23 III, 1894.	2. 37. 50. am.	Slight.
" " "	8. 54. 25 "	Weak.	" " "	2. 39. 20 pm.	Weak.
" " "	8. 56. 50 "	Slight.	" " "	3. 00. 30 "	Slight.
" " "	9. 42. 20 "	"	" " "	3. 23. 10 "	"
" " "	9. 49. 20 "	"	" " "	3. 24. 50 "	"
" " "	10. 21. 05 "	"	" " "	3. 29. 45 "	"
" " "	11. 00. 05 "	"	" " "	3. 36. 40 "	Weak.
" " "	11. 04. 50 "	"	" " "	3. 42. 50 "	"
" " "	11. 24. 35 "	"	" " "	3. 59. 10 "	Slight.
" " "	11. 30. 50 "	"	" " "	4. 02. 20 "	"
" " "	11. 52. 44 "	"	" " "	4. 05. 12 "	"
" " "	11. 54. 10 "	Weak.	" " "	4. 51. 30 "	"
" " "	11. 56. 27 "	Slight.	" " "	5. 23. 05 "	"
" " "	11. 59. 16 "	Weak.	" " "	5. 36. 40 "	"
" " "	0. 04. 39 pm.	Slight.	" " "	6. 06. 30 "	"
" " "	0. 05. 16 "	"	" " "	6. 07. 00 "	"
" " "	0. 09. 22 "	"	" " "	6. 10. 00 "	"
" " "	0. 19. 25 "	"	" " "	6. 54. 25 "	"
" " "	0. 22. 15 "	"	" " "	6. 58. 45 "	"
" " "	0. 23. 50 "	Weak.	" " "	7. 01. 29 "	Weak.
" " "	0. 25. 00 "	Slight.	" " "	7. 08. 50 "	"
" " "	0. 26. 33 "	"	" " "	7. 12. 00 "	Slight.
" " "	0. 29. 00 "	Weak.	" " "	7. 12. 59 "	"
" " "	0. 31. 10 "	Slight.	" " "	7. 28. 10 "	"
" " "	1. 17. 54 "	"	" " "	7. 37. 40 "	"
" " "	1. 26. 05 "	"	" " "	7. 44. 10 "	"
" " "	1. 26. 35 "	"	" " "	7. 46. 13 "	"
" " "	1. 31. 28 "	"	" " "	8. 06. 49 "	"
" " "	2. 04. 10 "	"	" " "	8. 07. 15 "	Weak.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
23 III, 1894.	8. 12. 25. pm.	Weak.	24 III, 1894.	6. 22. 45. am.	Slight.
" " "	8. 27. 00 "	"	" " "	6. 44. 07 "	"
" " "	9. 00. 00 "	Slight.	" " "	6. 52. 15 "	"
" " "	9. 02. 00 "	Weak.	" " "	6. 54. 10 "	"
" " "	9. 04. 00 "	Slight.	" " "	7. 13. 00 "	"
" " "	9. 18. 10 "	"	" " "	7. 40. 25 "	"
" " "	9. 37. 20 "	"	" " "	7. 48. 50 "	"
" " "	10. 03. 00 "	"	" " "	7. 54. 20 "	"
" " "	11. 31. 10 "	"	" " "	8. 35. 45 "	"
" " "	11. 37. 05 "	Weak.	" " "	8. 58. 00 "	"
" " "	11. 49. 15 "	"	" " "	9. 06. 00 "	"
" " "	11. 50. 20 "	"	" " "	9. 50. 50 "	"
24 " "	0. 14. 10 am.	Slight.	" " "	9. 59. 00 "	Weak.
" " "	0. 26. 00 "	"	" " "	10. 05. 50 "	Slight.
" " "	0. 37. 00 "	"	" " "	10. 26. 20 "	"
" " "	0. 37. 35 "	"	" " "	0. 27. 45 pm.	"
" " "	0. 39. 05 "	Weak.	" " "	0. 32. 06 "	"
" " "	0. 40. 00 "	Slight.	" " "	0. 59. 13 "	"
" " "	0. 47. 50 "	Weak.	" " "	1. 29. 47 "	"
" " "	1. 41. 20 "	Slight.	" " "	3. 10. 00 "	"
" " "	2. 35. 00 "	"	" " "	3. 37. 05 "	"
" " "	2. 47. 50 "	"	" " "	4. 08. 40 "	Weak.
" " "	3. 28. 28 "	"	" " "	4. 54. 10 "	Slight.
" " "	5. 47. 03 "	"	" " "	5. 00. 20 "	"
" " "	5. 19. 40 "	Weak.	" " "	5. 44. 00 "	"
" " "	5. 21. 50 "	"	" " "	5. 52. 00 "	"
" " "	5. 38. 00 "	"	" " "	6. 16. 15 "	"
" " "	6. 08. 40 "	Slight.	" " "	6. 22. 20 "	Weak.
" " "	6. 20. 45 "	"	" " "	7. 08. 00 "	Slight.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
24 III, 1894.	7. 33. 00. pm.	Slight.	25 III, 1894.	1. 36. 05. pm.	Slight.
" " "	8. 35. 00 " "	" "	" " "	1. 56. 21 " "	" "
" " "	9. 02. 00 " "	" "	" " "	2. 19. 00 " "	" "
" " "	9. 06. 20 " "	" "	" " "	2. 25. 33 " "	Weak.
" " "	9. 09. 20 " "	Weak.	" " "	2. 43. 30 " "	Slight.
" " "	9. 25. 00 " "	Slight.	" " "	3. 47. 00 " "	" "
" " "	9. 35. 00 " "	" "	" " "	4. 32. 00 " "	Weak.
" " "	9. 45. 55 " "	" "	" " "	4. 33. 10 " "	Slight.
" " "	11. 59. 00 " "	" "	" " "	5. 46. 50 " "	" "
25 " "	1. 16. 20 am.	" "	" " "	6. 27. 00 " "	" "
" " "	2. 22. 30 " "	Weak.	" " "	7. 24. 50 " "	" "
" " "	3. 24. 25 " "	Slight.	" " "	7. 34. 20 " "	" "
" " "	4. 04. 25 " "	" "	" " "	9. 19. 52 " "	" "
" " "	4. 12. 46 " "	Strong.	" " "	9. 58. 32 " "	" "
" " "	5. 42. 40 " "	Weak.	" " "	11. 44. 00 " "	Strong.
" " "	5. 44. 10 " "	Slight.	26 " "	0. 06. 35 am.	" "
" " "	6. 13. 58 " "	Strong.	" " "	0. 45. 45 " "	Weak.
" " "	6. 46. 00 " "	Slight.	" " "	1. 11. 57 " "	Slight.
" " "	7. 03. 50 " "	Strong.	" " "	3. 15. 55 " "	" "
" " "	7. 15. 00 " "	Slight.	" " "	3. 54. 55 " "	" "
" " "	7. 41. 00 " "	" "	" " "	4. 06. 50 " "	" "
" " "	8. 26. 58 " "	Weak.	" " "	4. 45. 00 " "	" "
" " "	9. 12. 50 " "	Slight.	" " "	4. 53. 50 " "	" "
" " "	9. 56. 00 " "	" "	" " "	5. 12. 25 " "	" "
" " "	10. 20. 00 " "	" "	" " "	6. 07. 40 " "	" "
" " "	10. 37. 30 " "	Weak.	" " "	7. 19. 10 " "	" "
" " "	11. 40. 20 " "	Slight.	" " "	8. 42. 50 " "	" "
" " "	11. 52. 50 " "	Weak.	" " "	9. 57. 41 " "	" "
" " "	0. 27. 21 pm.	" "	" " "	10. 07. 50 " "	Weak.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
26 III, 1894.	11. 26. 10. pm.	Slight.	28 III, 1894.	5. 15. 30. am.	Slight.
" " "	0. 01. 48 "	"	" " "	5. 45. 42 "	Weak.
" " "	0. 16. 25 "	Weak.	" " "	5. 52. 42 "	Slight.
" " "	3. 05. 45 "	"	" " "	7. 02. 40 "	"
" " "	3. 19. 32 "	Slight.	" " "	7. 07. 41 "	Weak.
" " "	4. 19. 35 "	"	" " "	7. 40. 55 "	Slight.
" " "	5. 34. 30 "	"	" " "	7. 44. 58 "	Weak.
" " "	6. 36. 40 "	"	" " "	7. 49. 30 pm.	"
" " "	7. 06. 30 "	"	29 " "	10. 51. 26 am.	Slight.
" " "	8. 42. 10 "	Weak.	" " "	0. 51. 20 pm.	"
" " "	8. 51. 45 "	"	" " "	5. 53. 10 "	Strong.
" " "	10. 31. 49 "	Slight.	30 " "	6. 18. 50 am.	Slight.
" " "	11. 30. 45 "	"	" " "	7. 20. 20 "	"
27 " "	2. 37. 20 am.	Weak.	" " "	6. 03. 50 pm.	"
" " "	4. 49. 41 "	"	" " "	6. 40. 25 "	"
" " "	6. 07. 39 "	Slight.	31 " "	2. 50. 47 am.	Weak.
" " "	7. 34. 50 "	"	" " "	3. 29. 55 "	"
" " "	7. 38. 34 "	"	" " "	8. 37. 50 "	Slight.
" " "	8. 49. 59 "	Weak.	" " "	2. 24. 30 pm.	"
" " "	11. 21. 00 "	Slight.	" " "	4. 00. 30 "	Weak.
" " "	5. 30. 43 pm.	Weak.	" " "	6. 13. 00 "	"
" " "	8. 12. 35 "	"	" " "	8. 44. 20 "	Slight.
" " "	8. 20. 20 "	"	" " "	11. 57. 59 "	"
" " "	9. 36. 00 "	Slight.	1 IV, "	1. 27. 22 am.	"
" " "	9. 41. 00 "	"	" " "	2. 03. 50 "	Weak.
" " "	11. 24. 20 "	"	" " "	2. 43. 45 "	"
28 " "	2. 11. 10 am.	"	" " "	8. 23. 09 pm.	Slight.
" " "	3. 37. 30 "	"	2 " "	0. 09. 25 am.	Weak.
" " "	4. 20. 17 "	"	" " "	2. 48. 05 "	Slight.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
2 IV, 1894.	2. 49. 05. pm.	Slight.	8 IV, 1894.	9. 36. 40 am.	Slight.
" " "	8. 36. 30 "	"	" " "	11. 45. 16 pm.	"
3 " "	5. 53. 50 "	"	9 " "	11. 16. 10 am.	"
" " "	6. 47. 40 "	"	" " "	11. 25. 45 "	"
" " "	8. 07. 02 "	"	" " "	2. 37. 30 pm.	"
4 " "	1. 24. 10 am.	"	" " "	6. 34. 20 "	"
" " "	1. 58. 05 "	Weak.	10 " "	1. 48. 30 am.	"
" " "	4. 38. 14 "	"	" " "	6. 53. 36 "	"
" " "	9. 22. 40 "	"	" " "	3. 52. 27 pm.	"
" " "	10. 43. 30 "	Slight.	" " "	7. 29. 10 "	"
" " "	3. 46. 50 pm.	"	" " "	8. 09. 25 "	"
" " "	7. 44. 00 "	"	" " "	8. 17. 58 "	"
" " "	8. 51. 11 "	Weak.	11 " "	1. 23. 50 am.	Strong.
5 " "	1. 26. 17 am.	Slight.	" " "	2. 18. 35 "	Slight.
" " "	5. 56. 55 "	"	" " "	3. 00. 25 "	"
" " "	8. 33. 10 "	"	" " "	6. 53. 30 "	"
" " "	5. 43. 13 pm.	"	" " "	9. 04. 00 "	"
" " "	11. 30. 09 "	"	" " "	10. 05. 49 "	"
6 " "	0. 36. 00 am.	"	" " "	10. 55. 00 "	"
" " "	4. 31. 03 "	Weak.	" " "	1. 03. 20 pm.	"
" " "	1. 10. 50 pm.	Slight.	" " "	11. 34. 45 am.	"
" " "	5. 31. 14 "	"	" " "	6. 37. 30 pm.	"
7 " "	6. 16. 43 am.	"	" " "	8. 11. 50 "	"
" " "	1. 12. 50 pm.	"	12 " "	0. 59. 50 am.	"
" " "	3. 18. 20 "	Weak.	" " "	5. 58. 40 "	"
" " "	7. 03. 00 "	Slight.	" " "	8. 23. 46 "	"
" " "	8. 13. 10 "	"	" " "	8. 52. 37 "	Weak.
" " "	9. 25. 40 "	"	" " "	9. 20. 06 "	Slight.
" " "	11. 29. 00 "	"	" " "	10. 03. 05 "	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
12 IV, 1894.	10. 45. 58 am.	Slight.	23 IV, 1894.	4. 35. 00 pm.	Slight.
" " "	2. 39. 50 pm.	Weak.	" " "	11. 37. 25 "	"
13 " "	0. 16. 46 am.	Slight.	24 " "	1. 15. 45 am.	"
" " "	2. 09. 36 "	"	" " "	2. 54. 51 "	"
" " "	2. 12. 40 "	"	" " "	8. 53. 00 "	"
" " "	9. 45. 14 "	"	25 " "	9. 15. 12 "	Strong.
" " "	7. 24. 20 "	"	" " "	0. 01. 26 pm.	Weak.
" " "	4. 52. 45 "	"	" " "	4. 54. 31 "	"
14 " "	8. 06. 30 "	"	27 " "	0. 11. 00 am.	"
" " "	2. 55. 00 pm.	"	" " "	3. 09. 55 "	Slight.
15 " "	10. 36. 15 am.	"	" " "	7. 50. 00 pm.	"
" " "	11. 02. 00 "	Weak.	28 " "	2. 06. 30 am.	"
" " "	11. 16. 00 "	Slight.	" " "	11. 46. 12 "	"
16 " "	6. 49. 25 "	Weak.	29 " "	2. 37. 00 "	"
" " "	11. 28. 38 "	"	" " "	7. 23. 32 "	Weak.
17 " "	5. 15. 02 pm.	"	" " "	8. 23. 11 pm.	Slight.
18 " "	2. 29. 06 "	Slight.	" " "	8. 35. 00 "	"
" " "	5. 04. 08 "	"	30 " "	3. 48. 01 am.	"
" " "	10. 54. 40 "	"	" " "	8. 39. 45 pm.	"
19 " "	0. 00. 20 am.	"	1 V, "	1. 30. 45 am.	"
" " "	10. 28. 45 "	Weak.	" " "	11. 46. 40 "	"
20 " "	8. 03. 40 "	Slight.	2 " "	1. 31. 40 pm.	"
" " "	7. 27. 25 pm.	Weak.	" " "	0. 02. 20 "	"
21 " "	3. 11. 35 "	Slight.	" " "	7. 06. 20 "	"
" " "	8. 31. 17 "	"	" " "	11. 22. 19 "	Weak.
22 " "	7. 35. 40 "	Weak.	4 " "	6. 13. 40 am.	Slight.
23 " "	6. 27. 30 am.	Slight.	" " "	8. 28. 13 "	"
" " "	7. 27. 40 "	"	5 " "	0. 44. 00 pm.	"
" " "	1. 21. 00 pm.	"	6 " "	3. 59. 00 "	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.			Intensity.	Date.			
Day, Month, Year.	Time of occurrence.	Day, Month, Year.		Time of occurrence.	Intensity.		
6	V, 1894.	4. 39. 03 pm.	Weak.	22	V, 1894.	8. 24. 21 pm.	Weak.
8	" "	10. 40. 00 am.	Slight.	24	" "	4. 23. 57 am.	Slight.
9	" "	8. 33. 28 pm.	"	"	" "	7. 48. 40 "	"
10	" "	4. 38. 27 am.	Weak.	26	" "	2. 41. 49 "	Weak.
"	" "	4. 58. 16 "	Slight.	"	" "	7. 20. 35 "	"
"	" "	4. 59. 17 "	Weak.	"	" "	10. 54. 26 pm.	Slight.
"	" "	8. 59. 00 pm.	Slight.	1	VI, 1894.	3. 21. 50 am.	"
"	" "	9. 45. 00 "	"	"	" "	5. 15. 10 "	Weak.
12	" "	4. 04. 18 am.	"	"	" "	7. 01. 15 pm.	"
"	" "	7. 05. 30 "	"	2	" "	2. 33. 00 am.	Slight.
"	" "	10. 21. 15 "	"	"	" "	11. 52. 03 "	"
14	" "	0. 15. 31 pm.	Weak.	5	" "	0. 23. 55 pm.	Weak.
15	" "	5. 30. 48 am.	Slight.	6	" "	5. 45. 45 "	Slight.
"	" "	8. 34. 11 "	"	7	" "	5. 03. 40 "	"
"	" "	11. 11. 11 "	"	8	" "	7. 36. 05 am.	"
16	" "	6. 59. 00 "	"	"	" "	0. 26. 35 pm.	"
17	" "	11. 26. 16 "	"	9	" "	9. 02. 48 am.	"
"	" "	3. 45. 45 pm.	"	"	" "	10. 33. 35 "	"
"	" "	6. 49. 50 "	"	"	" "	4. 51. 55 pm.	"
19	" "	4. 16. 56 am.	Weak.	10	" "	4. 24. 05 am.	"
"	" "	5. 44. 10 pm.	Slight.	"	" "	7. 40. 10 "	"
"	" "	7. 52. 50 "	"	"	" "	6. 23. 00 pm.	"
20	" "	5. 01. 30 "	"	11	" "	8. 30. 40 am.	Weak.
21	" "	2. 16. 46 am.	"	12	" "	8. 16. 25 "	Slight.
22	" "	2. 22. 30 "	Weak.	"	" "	2. 33. 20 pm.	Weak.
"	" "	2. 37. 10 "	Slight.	"	" "	10. 42. 21 "	Slight.
"	" "	5. 35. 03 "	"	14	" "	6. 00. 35 "	"
"	" "	9. 53. 02 "	"	16	" "	11. 17. 47 am.	"
"	" "	10. 12. 32 "	"	"	" "	6. 29. 36 pm.	Weak.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity,	Date. Day, Month, Year.	Time of occurrence.	Intensity.
19 VI, 1894.	1. 26. 25 am.	Slight.	19 VII, 1894.	3. 41. 51 pm.	Slight.
" " "	5. 49. 43 pm.	Weak.	20 " "	8. 36. 51 am.	"
" " "	0. 33. 58 "	Slight.	" " "	11. 45. 45 pm.	"
22 " "	6. 55. 43 "	Weak.	" " "	11. 50. 35 "	Weak.
25 " "	11. 37. 12 am.	"	21 " "	9. 57. 48 am.	Slight.
26 " "	0. 35. 00 "	"	" " "	0. 10. 25 pm.	"
" " "	5. 58. 31 pm.	Slight.	" " "	10. 29. 25 "	"
27 " "	7. 21. 20 "	"	24 " "	9. 28. 01 am.	"
28 " "	2. 05. 00 am.	Weak.	27 " "	11. 09. 12 "	"
" " "	3. 02. 01 "	Slight.	28 " "	3. 13. 07 pm.	"
" " "	11. 15. 00 "	"	30 " "	7. 50. 40 "	"
" " "	11. 05. 00 pm.	"	2 VIII, "	2. 57. 20 "	"
29 " "	9. 42. 52 am.	"	3 " "	5. 59. 25 "	Weak.
30 " "	4. 44. 43 "	"	4 " "	7. 32. 00 am.	Slight.
" " "	5. 18. 48 "	"	" " "	4. 33. 10 pm.	"
" " "	7. 28. 33 "	"	10 " "	5. 53. 35 am.	Weak.
1 VII, 1894.	11. 19. 16 "	"	" " "	3. 27. 35 pm.	Slight.
2 " "	0. 13. 55 pm.	"	11 " "	4. 46. 15 am.	"
" " "	3. 43. 30 "	Weak.	12 " "	11. 47. 46 "	"
" " "	11. 34. 05 "	"	18 " "	3. 57. 50 "	"
5 " "	5. 06. 00 "	"	" " "	4. 31. 35 pm.	Weak.
7 " "	1. 21. 13 "	"	19 " "	6. 49. 05 "	Slight.
8 " "	1. 09. 55 am.	Slight.	25 " "	3. 12. 43 am.	"
" " "	1. 36. 56 "	"	" " "	11. 21. 30 pm.	Weak.
12 " "	0. 51. 40 "	Weak.	27 " "	1. 55. 34 "	"
" " "	7. 02. 45 pm.	"	28 " "	10. 57. 05 am.	Slight.
13 " "	3. 03. 20 "	Slight.	" " "	10. 59. 30 "	"
14 " "	6. 51. 45 "	Strong.	" " "	1. 08. 30 "	"
18 " "	6. 25. 59 am.	Slight.	30 " "	7. 03. 10 "	"



## EARTHQUAKES OBSERVED AT NEMURO. (Cont)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
30 VIII, 1894.	11. 26. 45. pm.	Slight.	4 X, 1894.	2. 44. 10. pm.	Weak.
1 IX, "	2. 44. 40 am.	"	5 " "	4. 15. 59 "	Slight.
" " "	3. 17. 20 "	"	6 " "	3. 18. 15 "	"
2 " "	0. 32. 25 "	"	" " "	8. 01. 15 "	"
" " "	2. 01. 35 "	"	7 " "	0. 25. 00 "	"
" " "	7. 13. 00 "	"	8 " "	6. 16. 29 "	"
5 " "	4. 52. 00 pm.	"	9 " "	7. 41. 40 "	"
" " "	6. 26. 25 "	"	12 " "	3. 38. 43 "	"
" " "	8. 15. 20 "	"	13 " "	3. 55. 00 "	"
6 " "	1. 07. 05 "	Weak.	14 " "	5. 05. 20 am.	"
7 " "	7. 59. 00 "	Slight.	15 " "	10. 22. 04 "	"
8 " "	2. 57. 02 am.	"	16 " "	7. 58. 18 pm.	"
" " "	8. 46. 20 "	"	17 " "	4. 21. 30 am.	"
" " "	0. 34. 40 pm.	"	" " "	10. 37. 49 pm.	"
9 " "	3. 15. 45 am.	"	18 " "	7. 10. 00 am.	"
10 " "	9. 27. 38 pm.	"	19 " "	2. 04. 15 pm.	Weak.
14 " "	11. 10. 54 "	"	" " "	2. 10. 26 "	"
16 " "	8. 17. 40 am.	"	21 " "	6. 50. 32 "	Slight.
18 " "	4. 49. 30 "	"	23 " "	3. 49. 39 am.	"
19 " "	0. 44. 15 "	"	" " "	4. 30. 23 "	"
21 " "	0. 31. 03 "	"	24 " "	1. 19. 54 "	"
25 " "	3. 53. 20 pm.	"	" " "	2. 55. 45 "	"
26 " "	2. 57. 07 "	"	" " "	8. 32. 00 "	"
29 " "	6. 05. 00 "	"	29 " "	4. 35. 00 pm.	"
2 X, "	2. 39. 50 am.	"	30 " "	9. 17. 25 am.	"
" " "	0. 49. 19 "	Weak.	5 XI, "	10. 44. 14 pm.	"
3 " "	3. 07. 00 "	Slight.	7 " "	9. 11. 34 am.	"
4 " "	7. 59. 10 "	"	8 " "	11. 20. 51 "	"
" " "	11. 39. 46 "	"	" " "	4. 33. 18 "	Weak.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.			Time of	Intensity.	Date.			Time of	Intensity.
Day,	Month,	Year.	occurrence.		Day,	Month,	Year.	occurrence.	
14	XI,	1894.	6. 04. 00. am.	Slight.	21	I,	1895.	6. 37. 00. am.	Weak.
"	"	"	3. 19. 00 pm.	"	22	"	"	1. 35. 18 pm.	Slight.
15	"	"	1. 08. 35 am.	"	24	"	"	6. 20. 15 "	"
17	"	"	3. 08. 58 "	"	"	"	"	6. 20. 56 "	"
18	"	"	5. 04. 10 pm.	Weak.	27	"	"	10. 40. 20 am.	"
19	"	"	2. 44. 59 am.	Slight.	29	"	"	3. 44. 35 pm.	"
20	"	"	10. 14. 41 "	"	30	"	"	5. 36. 05 am.	"
21	"	"	11. 11. 20 pm.	"	8	II,	"	11. 00. 00 "	"
22	"	"	8. 35. 50 am.	"	9	"	"	5. 38. 30 "	"
27	"	"	3. 47. 15 "	"	15	"	"	1. 20. 00 "	"
"	"	"	6. 42. 03 pm.	"	19	"	"	0. 23. 45 "	"
28	"	"	1. 03. 45 am.	Weak.	20	"	"	11. 43. 19 "	"
29	"	"	1. 45. 40 "	"	21	"	"	3. 19. 18 pm.	"
2	XII,	"	4. 29. 30 "	Slight.	22	"	"	6. 45. 00 am.	"
"	"	"	10. 02. 00 "	"	23	"	"	4. 50. 10 "	"
4	"	"	2. 40. 00 "	"	"	"	"	7. 50. 40 "	"
"	"	"	4. 28. 00 "	"	24	"	"	3. 15. 30 pm.	"
"	"	"	9. 27. 50 "	"	5	III,	"	4. 48. 00 "	"
7	"	"	4. 51. 40 "	"	7	"	"	7. 22. 40 "	"
8	"	"	11. 54. 50 pm.	"	10	"	"	5. 24. 12 am.	"
16	"	"	11. 40. 05 am.	"	11	"	"	3. 04. 08 pm.	"
"	"	"	3. 30. 00 pm.	"	12	"	"	2. 33. 00 am.	"
"	"	"	9. 32. 42 "	"	"	"	"	5. 39. 25 "	"
17	"	"	7. 11. 22 am.	"	15	"	"	4. 57. 17 pm.	Weak.
19	"	"	5. 05. 15 pm.	"	17	"	"	4. 33. 49 "	Slight.
2	I,	1895.	4. 39. 10 am.	"	20	"	"	0. 30. 56 "	"
"	"	"	6. 56. 49 "	"	22	"	"	7. 09. 30 "	"
17	"	"	5. 54. 00 pm.	"	25	"	"	9. 20. 38 "	"
20	"	"	0. 03. 20 "	"	29	"	"	5. 20. 06 "	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.			Intensity.	Date.		
Day,	Month,	Year.		Day,	Month,	Year.
Time of occurrence.			Intensity.	Time of occurrence.		
3	IV,	1895.		Slight.	5	VI,
"	"	"	"	7	"	"
"	"	"	"	12	"	"
5	"	"	"	25	"	"
"	"	"	"	26	"	"
7	"	"	Weak.	30	"	"
8	"	"	Slight.	2	VII,	"
15	"	"	"	3	"	"
16	"	"	"	7	"	"
17	"	"	"	17	"	"
"	"	"	"	18	"	"
25	"	"	"	19	"	"
"	"	"	"	21	"	"
27	"	"	"	25	"	"
"	"	"	"	28	"	"
"	"	"	"	31	"	"
1	V,	"	"	3	VIII,	"
3	"	"	"	"	"	"
4	"	"	"	4	"	"
5	"	"	"	6	"	"
8	"	"	"	13	"	"
14	"	"	"	17	"	"
19	"	"	Weak.	19	"	"
21	"	"	Slight.	23	"	"
22	"	"	"	25	"	"
25	"	"	"	29	"	"
27	"	"	"	6	IX,	"
1	VI,	"	"	7	"	"
"	"	"	"	9	"	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.			Intensity.	Date.				
Day,	Month,	Year.		Day,	Month,	Year.		
Time of occurrence.				Time of occurrence.				
				Intensity.				
10	IX,	1895.	9. 42. 44. pm.	Slight.	10	XII, 1895.	7. 29. 41 pm.	Slight.
13	"	"	2. 29. 40 "	"	13	" "	9. 47. 57 am.	"
"	"	"	10. 00. 15 "	Weak.	15	" "	2. 55. 59 "	"
15	"	"	2. 20. 52 am.	Slight.	16	" "	11. 51. 56 "	"
19	"	"	1. 12. 58 "	Weak.	17	" "	3. 52. 30 "	"
20	"	"	5. 46. 54 pm.	Slight.	18	" "	4. 54. 00 "	"
24	"	"	4. 29. 06 "	"	22	" "	3. 36. 20 "	Weak.
30	"	"	3. 21. 30 am.	"	1	I, 1896.	5. 44. 54 "	Slight.
8	X,	"	1. 13. 48 "	Weak.	3	" "	9. 03. 00 pm.	"
13	"	"	8. 36. 00 pm.	Slight.	8	" "	9. 34. 51 "	"
18	"	"	3. 14. 45 "	"	24	" "	11. 18. 15 am.	"
21	"	"	11. 54. 00 am.	"	15	II,	1. 12. 09 "	Weak.
"	"	"	10. 36. 00 pm.	"	16	" "	11. 29. 05 pm.	Slight.
26	"	"	9. 07. 33 am.	"	24	" "	1. 29. 48 am.	"
27	"	"	11. 50. 13 "	"	9	III,	10. 15. 00 pm.	"
28	"	"	11. 45. 12 pm.	"	12	" "	1. 50. 00 "	very. Slight.
30	"	"	9. 49. 07 am.	"	15	" "	10. 44. 30 "	Weak.
"	"	"	10. 42. 10 pm.	Weak.	16	" "	3. 08. 10 am.	Slight.
4	XI,	"	3. 32. 27 "	Slight.	17	" "	0. 24. 05 "	"
6	"	"	0. 55. 07 "	"	"	" "	7. 55. 50 "	"
10	"	"	2. 41. 32 am.	"	24	" "	9. 06. 10 pm.	"
"	"	"	5. 43. 38 "	"	2	IV,	7. 30. 10 am.	Weak.
"	"	"	10. 43. 22 "	"	13	" "	10. 10. 20 pm.	"
24	"	"	0. 57. 50 pm.	"	19	" "	10. 53. 55 am.	Slight.
26	"	"	7. 40. 20 am.	"	"	" "	7. 58. 25 pm.	"
4	XII,	"	1. 34. 27 pm.	"	30	" "	9. 41. 00 "	"
"	"	"	1. 42. 20 "	"	2	V,	11. 40. 40 am.	Weak.
5	"	"	11. 38. 28 "	"	3	" "	6. 49. 19 pm.	Slight.
10	"	"	3. 23. 19 "	"	6	" "	5. 54. 18 "	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.	Date. Day, Month, Year.	Time of occurrence.	Intensity.
9 V, 1896.	5. 29. 25 am.	Slight.	10 VIII, 1896.	9. 57. 10 am.	Slight.
10 " "	3. 33. 00 "	"	12 " "	4. 08. 02 pm.	"
11 " "	9. 22. 30 "	"	16 " "	4. 39. 40 "	"
14 " "	0. 58. 40 pm.	"	22 " "	1. 40. 31 "	"
11 VI, "	4. 08. 01 "	"	" " "	2. 00. 00 "	"
14 " "	10. 59. 20 "	"	28 " "	11. 07. 22 am.	"
15 " "	7. 34. 20 "	"	4 IX, "	10. 20. 50 "	"
22 " "	7. 39. 30 am.	"	6 " "	9. 55. 00 "	"
25 " "	0. 66. 13 pm.	Weak.	8 " "	6. 25. 18 pm.	"
26 " "	10. 10. 30 "	Slight.	15 " "	5. 49. 21 "	"
30 " "	5. 09. 20 am.	"	" " "	6. 04. 00 am.	Very Slight.
1 VII, "	5. 30. 20 "	"	17 " "	3. 33. 10 "	Weak.
2 " "	9. 00. 00 pm.	"	25 " "	9. 03. 45 pm.	Slight.
" " "	10. 06. 00 "	"	26 " "	5. 15. 00 am.	"
" " "	10. 13. 00 "	"	27 " "	4. 57. 30 pm.	"
3 " "	5. 44. 00 am.	"	28 " "	7. 03. 00 "	"
" " "	3. 52. 00 pm.	"	29 " "	10. 58. 00 "	"
4 " "	3. 12. 50 am.	"	22 X, "	10. 30. 45 am.	"
5 " "	3. 50. 20 pm.	"	3 XI, "	3. 55. 54 "	"
7 " "	11. 55. 38 am.	"	" " "	8. 14. 40 "	"
8 " "	1. 58. 45 pm.	"	18 " "	11. 03. 21 "	Strong.
9 " "	8. 59. 20 am.	Weak.	19 " "	5. 12. 16 pm.	Slight.
23 " "	4. 51. 28 "	Slight.	20 " "	11. 29. 50 am.	"
" " "	7. 55. 58 "	"	24 " "	7. 44. 40 pm.	"
24 " "	1. 16. 07 "	"	4 XII, "	9. 46. 05 am.	Weak.
28 " "	3. 18. 10 "	"	" " "	6. 55. 41 pm.	"
1 VIII, "	11. 50. 46 "	"	5 " "	7. 24. 00 "	Slight.
2 " "	7. 01. 40 "	"	8 " "	2. 18. 51 am.	"
" " "	11. 16. 10 "	"	9 " "	9. 51. 55 "	Weak.

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.		Time of	Intensity.	Date.		Time of	Intensity.
Day, Month, Year.	occurrence.	Day, Month, Year.		occurrence.			
12	XII, 1896.	7. 08. 35 pm.	Slight.	5	V, 1897.	11. 14. 09 pm.	Slight.
13	" "	5. 24. 07 am.	"	6	" "	1. 11. 14 am.	Weak.
19	" "	4. 40. 00 "	Very Slight.	23	" "	9. 24. 05 pm.	Slight.
				26	" "	8. 56. 23 am.	"
				31	" "	8. 39. 56 "	Weak.
4	I, 1897.	7. 26. 29 am.	Slight.	1	VI, "	3. 46. 49 "	Slight.
8	" "	1. 22. 30 "	"	4	" "	8. 48. 58 "	"
20	" "	3. 48. 05 "	"	"	" "	11. 09. 25 pm.	"
"	" "	10. 39. 53 "	"	13	" "	5. 35. 00 "	"
23	" "	2. 54. 45 pm.	"	15	" "	6. 11. 45 am.	Weak.
20	II, "	5. 49. 45 am.	"	17	" "	2. 08. 00 "	"
"	" "	7. 58. 27 pm.	"	19	" "	11. 05. 00 pm.	Slight.
"	" "	8. 00. 35 "	Weak.	21	" "	1. 53. 30 "	"
21	" "	0. 00. 10 "	Slight.	23	" "	1. 50. 30 am.	"
23	" "	11. 31. 55 am.	"	5	VII, "	8. 26. 00 pm.	"
25	" "	3. 20. 55 pm.	"	21	" "	5. 13. 13 "	"
2	III, "	11. 29. 10 "	"	24	" "	4. 49. 50 "	"
4	" "	0. 37. 41 am.	"	2	VIII, "	4. 18. 44 am.	"
12	" "	9. 47. 07 pm.	"	4	" "	1. 24. 30 "	"
19	" "	4. 36. 10 "	"	5	" "	9. 12. 20 "	"
23	" "	7. 26. 50 am.	"	7	" "	6. 58. 55 "	"
25	" "	6. 05. 00 "	"	22	" "	10. 47. 29 "	"
27	" "	5. 01. 50 "	Weak.	28	" "	3. 57. 12 "	"
7	IV, "	0. 17. 05 pm.	Slight.	4	IX, "	1. 43. 55 pm.	"
9	" "	10. 29. 30 am.	"	13	" "	10. 23. 00 "	"
13	" "	5. 10. 00 "	"	2	X, "	9. 47. 00 "	"
"	" "	7. 28. 10 "	"	21	" "	9. 04. 00 "	"
15	" "	8. 03. 13 "	"	22	" "	0. 25. 43 "	"
29	" "	3. 17. 48 "	"	24	" "	2. 54. 00 "	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.			Time of	Intensity.	Date.			Time of	Intensity.
Day,	Month,	Year.	occurrence.		Day,	Month,	Year.	occurrence.	
25	X,	1897.	9. 20. 00 am.	Slight.	16	VI,	1898.	9. 25. 00 am.	Slight.
26	"	"	9. 40. 20 "	"	30	"	"	0. 07. 30 pm.	"
31	"	"	3. 15. 20 pm.	Weak.	4	VII,	"	11. 04. 00 "	"
20	XI,	"	8. 50. 23 am.	Slight.	16	VIII,	"	4. 54. 12 "	"
28	"	"	5. 57. 00 "	"	18	"	"	0. 59. 50 "	"
1	XII,	"	8. 19. 15 pm.	"	21	"	"	0. 09. 36 am.	"
4	"	"	6. 02. 00 am.	"	19	IX,	"	4. 50. 36 pm.	"
"	"	"	9. 17. 55 "	"	"	"	"	9. 08. 43 "	"
15	"	"	10. 51. 57 "	"	24	"	"	9. 10. 35 am.	"
					3	X,	"	6. 50. 32 pm.	"
					4	"	"	3. 58. 50 am.	"
15	I,	1898.	8. 52. 00 am.	Slight.	"	"	"	7. 53. 09 "	"
"	"	"	9. 26. 00 pm.	"	"	"	"	11. 19. 57 pm.	"
24	"	"	11. 43. 15 "	"	8	"	"	11. 36. 25 am.	"
30	"	"	1. 53. 00 "	"	15	"	"	2. 10. 45 "	"
14	II,	"	11. 56. 00 am.	"	18	"	"	1. 23. 02 "	"
15	"	"	0. 57. 10 pm.	Weak.	28	"	"	0. 48. 32 "	"
17	"	"	9. 30. 00 "	Slight.	31	"	"	6. 17. 23 pm.	"
23	III,	"	8. 05. 55 "	Weak.	3	XI,	"	3. 41. 47 "	"
14	IV,	"	10. 21. 40 "	Slight.	4	"	"	4. 34. 17 "	"
23	"	"	8. 37. 03 am.	"	14	"	"	4. 03. 35 "	Weak.
26	"	"	8. 23. 19 pm.	"	16	"	"	2. 29. 11 "	Slight.
5	V,	"	7. 57. 31 am.	"	22	"	"	11. 49. 50 am.	"
"	"	"	10. 07. 00 pm.	"	12	XII,	"	11. 47. 29 pm.	"
9	"	"	1. 13. 21 am.	"	16	"	"	11. 48. 04 am.	"
14	"	"	8. 28. 09 "	Weak.					
18	"	"	5. 25. 47 "	Slight.					
6	VI,	"	10. 57. 24 "	"	9	I,	1899.	1. 51. 50 pm.	Slight.
8	"	"	6. 21. 45 pm.	"	2	II,	"	5. 57. 00 "	"

## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date.			Time of occurrence.	Intensity.	Date.			Time of occurrence.	Intensity.
Day,	Month,	Year.			Day,	Month,	Year.		
4	II,	1899.	5. 36. 33 pm.	Slight.	11	VII,	1899.	7. 13. 49 am.	Slight.
10	"	"	10. 34. 25 am.	Weak.	"	"	"	4. 38. 34 pm.	"
25	"	"	6. 11. 58 "	Slight.	17	"	"	11. 18. 12 am.	"
17	III,	"	3. 22. 03 pm.	"	"	"	"	5. 30. 30 pm.	"
21	"	"	9. 44. 23 am.	"	20	"	"	4. 36. 31 "	"
26	"	"	0. 35. 18 "	"	"	"	"	5. 10. 08 "	"
29	"	"	0. 01. 48 "	"	25	"	"	8. 44. 26 am.	"
14	IV,	"	11. 14. 38 "	"	31	"	"	10. 51. 58 "	"
15	"	"	11. 06. 37 "	"	3	VIII,	"	6. 52. 17 pm.	"
23	"	"	8. 16. 30 "	"	4	"	"	4. 46. 42 "	"
27	"	"	10. 31. 23 pm.	"	10	"	"	5. 00. 31 am.	"
28	"	"	7. 35. 09 am.	"	16	"	"	10. 16. 31 pm.	"
8	V,	"	0. 25. 59 pm.	Strong.	14	IX,	"	8. 40. 04 "	"
9	"	"	6. 25. 56 am.	Slight.	15	"	"	0. 33. 10 am.	Weak.
10	"	"	6. 15. 42 pm.	"	17	"	"	4. 55. 50 pm.	Slight.
19	"	"	5. 07. 40 "	"	5	X,	"	9. 21. 21 "	"
31	"	"	1. 32. 50 "	"	6	"	"	1. 17. 09 am.	"
"	"	"	8. 11. 11 "	"	9	"	"	3. 07. 45 "	"
5	VI,	"	1. 51. 10 am.	"	10	"	"	11. 04. 09 "	"
"	"	"	3. 41. 04 "	"	18	"	"	3. 03. 58 pm.	"
"	"	"	10. 57. 40 "	"	25	"	"	8. 27. 31 "	"
17	"	"	10. 09. 30 "	"	31	"	"	8. 45. 50 am.	"
18	"	"	2. 13. 48 pm.	"	"	"	"	5. 48. 19 "	"
19	"	"	10. 28. 15 "	"	8	XI,	"	9. 48. 45 pm.	"
26	"	"	5. 17. 15 "	"	11	"	"	4. 30. 35 "	"
1	VII,	"	4. 17. 38 "	"	10	"	"	8. 56. 10 "	Weak.
2	"	"	10. 35. 35 am.	"	18	"	"	4. 01. 24 "	Slight.
6	"	"	8. 38. 01 "	"	22	"	"	6. 37. 00 am.	"
10	"	"	5. 34. 10 pm.	"	23	"	"	6. 51. 30 pm.	"



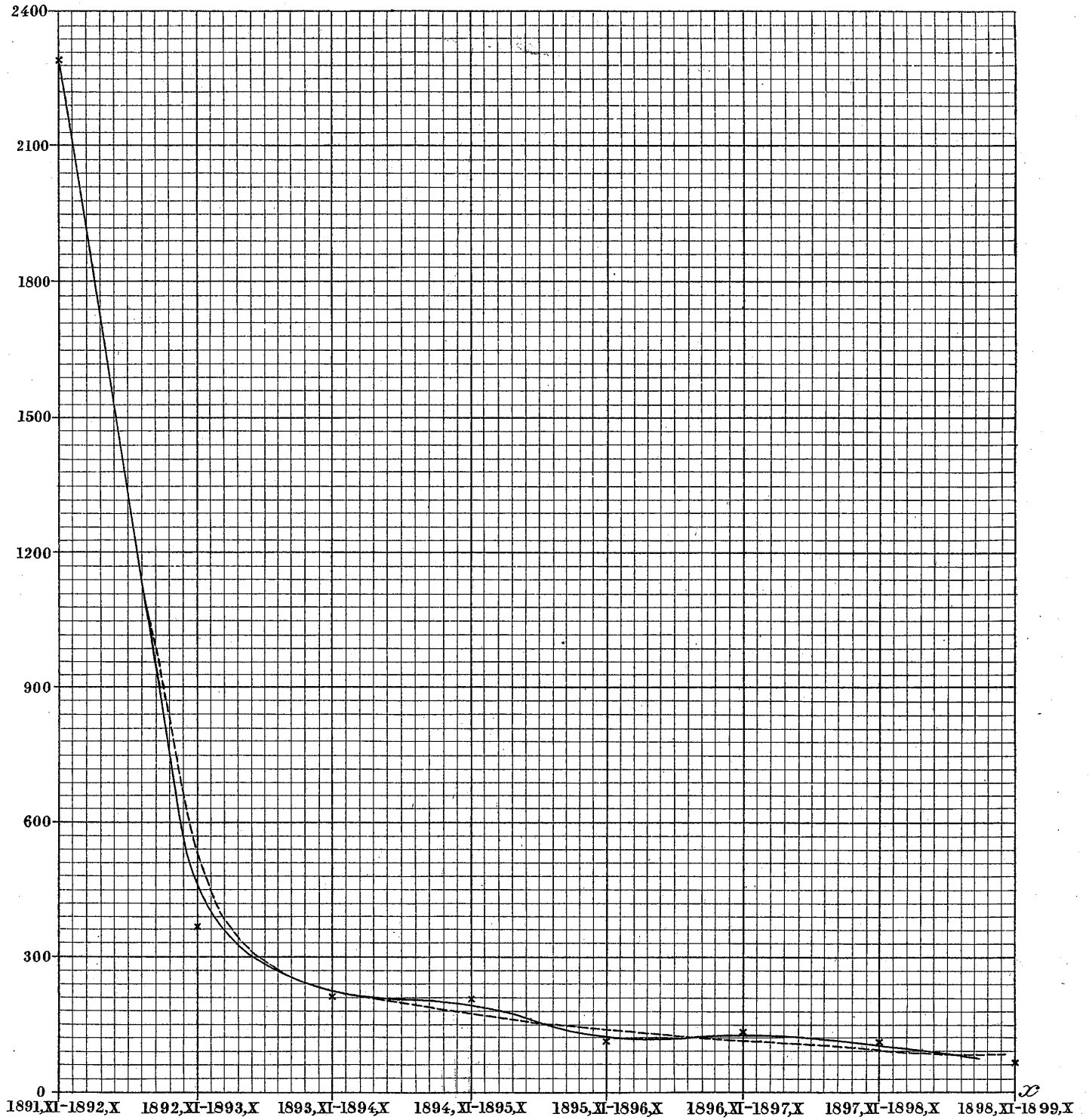
## EARTHQUAKES OBSERVED AT NEMURO. (Cont.)

Date. Day, Month, Year.	Time of occurrence.	Intensity.			
26 XI, 1899.	7. 41. 41 am.	Slight.			
29. XII. „	5. 45. 23 pm.	„			

Fig. 1. Time Variation of the Frequency of the Mino-Owari  
After-shocks. (Gifu).

$x$  = Time, (unit 12 months.)

$y$  = Number of earthquakes at Gifu during the 12 months denoted by  $x$ .



(The dotted curve, which is a rectangular hyperbola, has been drawn through the *mean* points.)

Fig. 2. Distribution of the Mino-Owari After-shocks. November 1891.

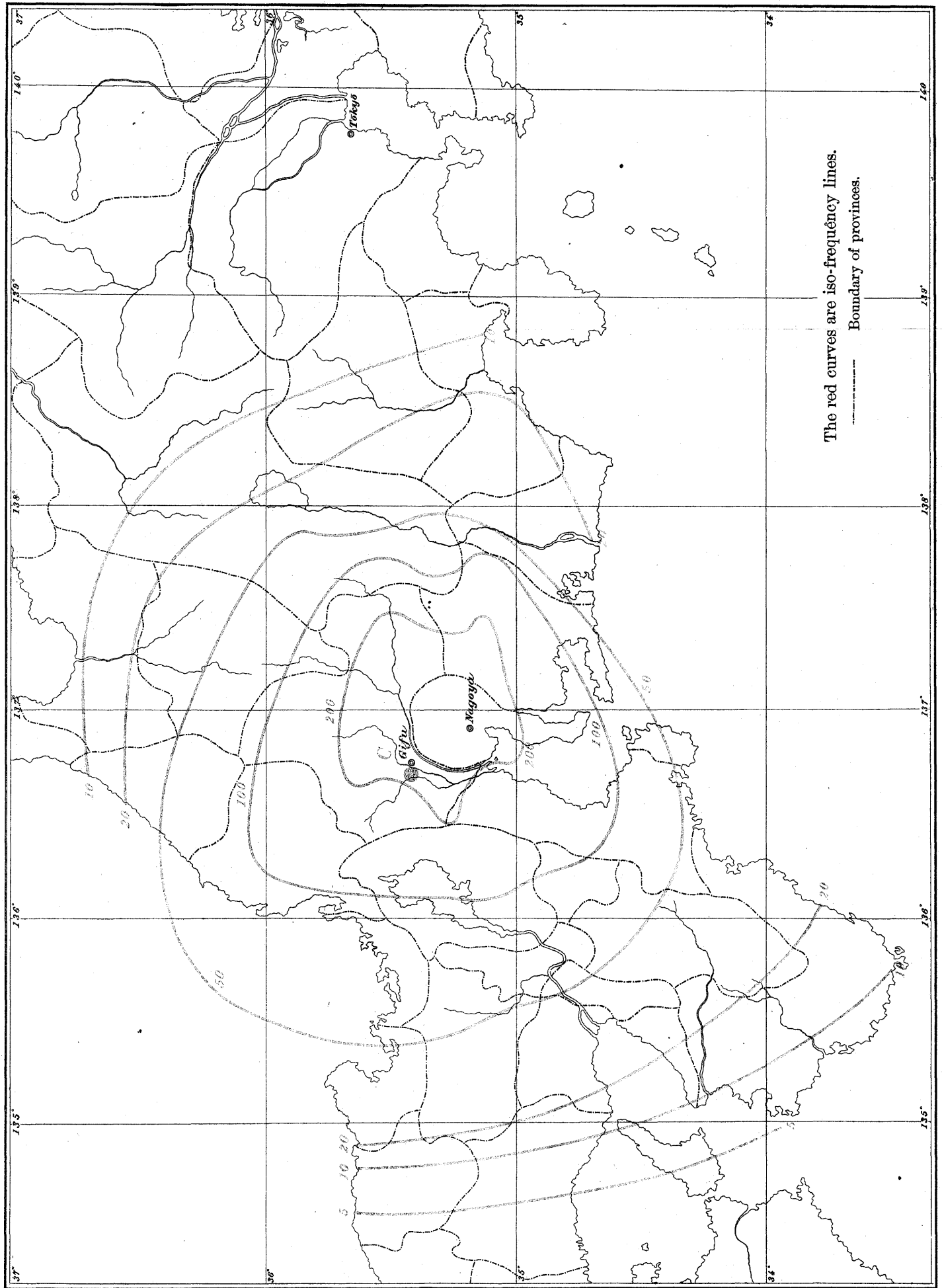
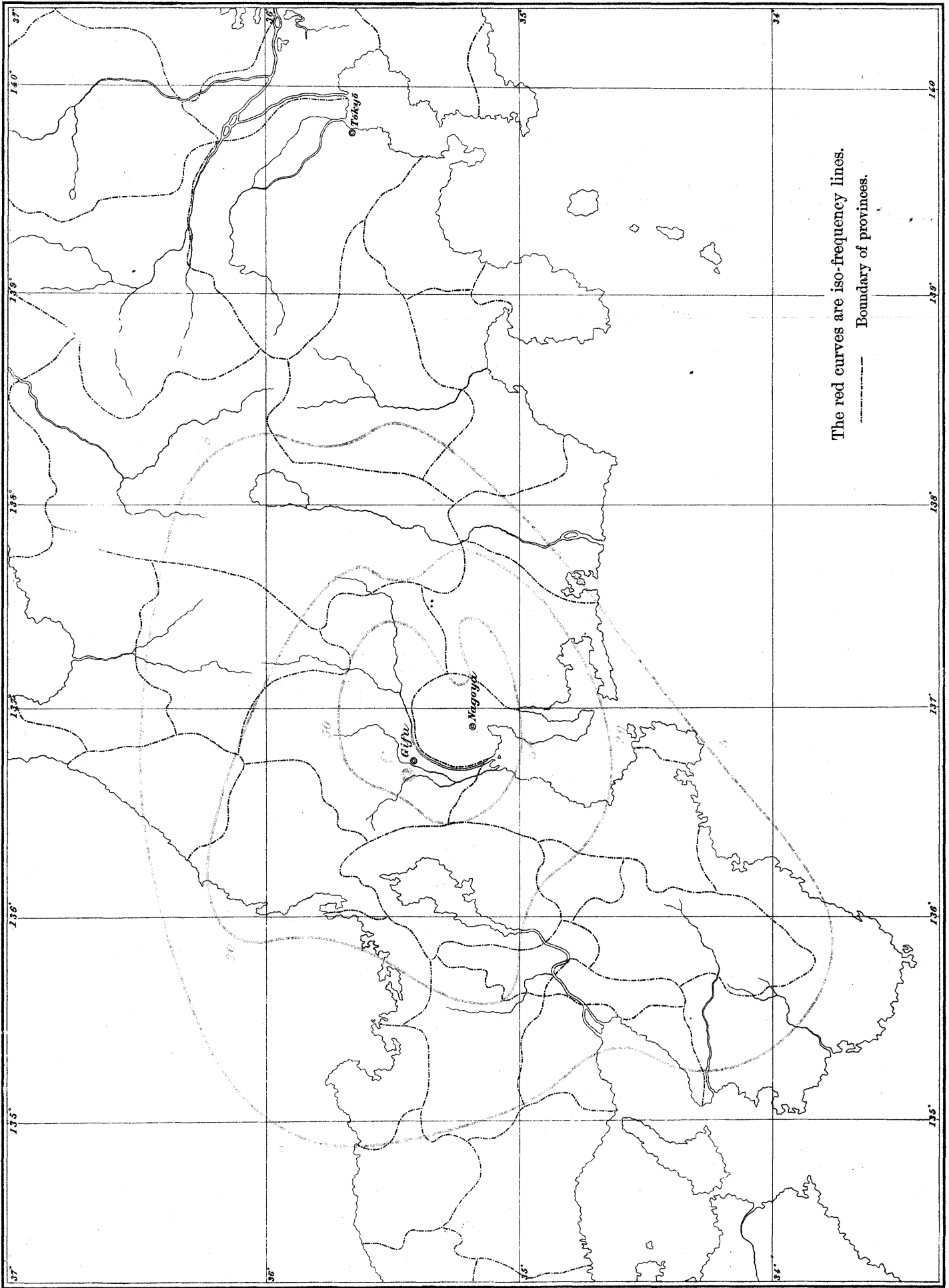
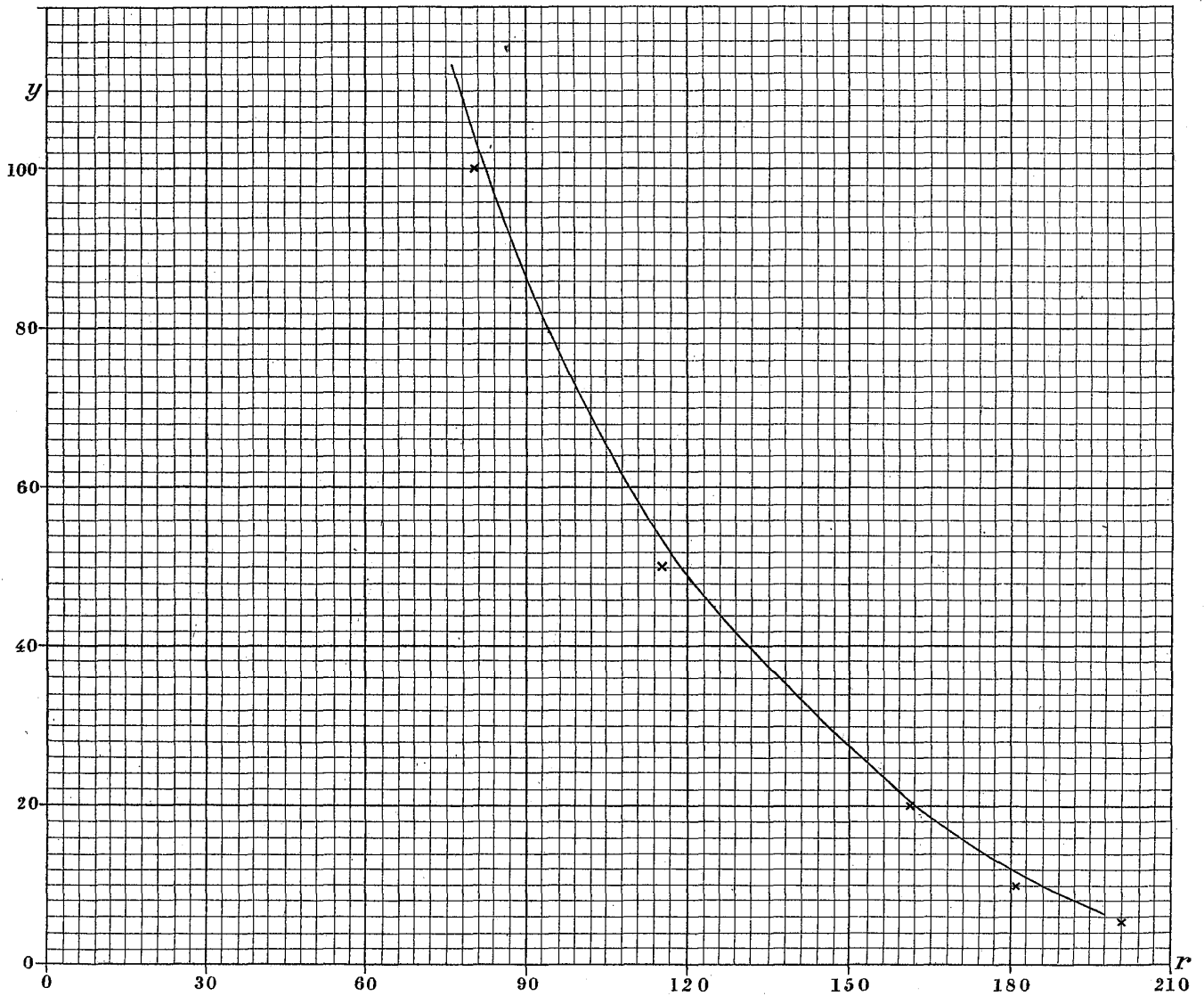


Fig. 3. Distribution of the Mino-Owari After-shocks. November 1891.



The red curves are iso-frequency lines.  
----- Boundary of provinces.

Fig. 4. Space Variation of the Frequency of the Mino-Owari  
After-shocks. (Nov. 1891.)



$r$  = Distance (in Km) from the epicentre of the after-shocks.  
 $y$  = Number of after-shocks corresponding to the distance  $r$ .