Earthquake Distributions in Formosa.

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With Pls. XXXIII and XXXIV.

CONTENTS.

1. ***Introduction.*** The meteorological observatory of Taihoku was first opened on Aug. 11, 1896, and the six other observatories of Taichu, Tainan, Taito, Koshun, Hokoto and Keelung, were established in the course of the next five years, namely, between 1897 and 1901. The yearly numbers of sensible earthquakes recorded at these seven stations, which are now furnished with seismological instruments, were as follows :—

TABLE I.—YEARLY NUMBERS OF SENSIBLE EARTHQUAKES RECORDED AT THE DIFFERENT METEOROLOGICAL OBSERVATORIES IN FORMOSA.

Station. / Year.	Taihoku.	Taichu.	Tainan.	Taito.	Koshun.	Hokoto.	Keelung.
1896	—	—	—	—	—	—	—
1897	7	3	9	—	—	1	—
1898	17	5	4	—	3	2	—
1899	9	10	4	—	5	2	—
1900	5	3	4	—	1	2	—

TABLE I. *(Cont.)*

Station. / Year.	Taihoku.	Taichu.	Tainan.	Taito.	Koshun.	Hokoto.	Keelung.
1901	12	4	8	2	1	2	—
1902	13	10	12	12	5	5	6
1903	7	14	19	117*	7	6	7
1904	9	10	9	8	4	6	5
1905	12	24	8	32	3	4	5
1906	10	40*	42*	21*	11*	19*	4
1907	11	10	11	6	6	10	6
Mean.	10.2	9.3	8.8	12.0	3.9	4.0	5.5

The large yearly number for Taito in 1903 was due to the after-shocks of the strong earthquake of Sep. 7 of the same year. Similarly, the high seismic frequency in 1906 for the different stations, except Taihoku and Keelung, were due to the after-shocks of the destructive earthquakes of March 17th and April 14th in that year. These numbers, each marked in the above table by an *asterisk*, have been excluded in deducing the average values, which may be regarded as approximately giving the frequencies of the sensible seismic disturbances in the ordinary year for the seven meteorological observatories in question. It will be noticed that this frequency was about 10, namely, 8.8 to 12.0 for Taichu, Taito, Taihoku, and Tainan, but smaller and equal to about 4 for Koshun and Hokoto, and 5.5 for Keelung.

The earthquake numbers, as above described, give, however, no adequate idea of the earthquake distribution for the whole of the Island. In fact the greatest seismic activity is displayed in regions at some distances from the different meteorological observa-

tories, namely:—(1), in the vicinity of the city of Kagi, which is situated in the south-western part of Formosa and midway between Taichu and Tainan; and, (2), at the central and northern parts of the eastern coast and at the very southern extremity of the Island. Great credit is due to Mr. H. Kondo, Director-general of the Formosa meteorological observatories, who instituted in 1907 a general system of the observation of the precipitation by establishing in different parts of the Island nearly 80 stations furnished with rain-gauges, Each of these stations sends in regularly to the Meteorological Observatory of Taihoku the monthly weather report, giving amongst others the notices of the earthquakes felt. The following table, compiled from these materials, indicates the numbers of the sensible shocks in different parts of Formosa during the four years from 1904 to 1907.

TABLE II.—YEARLY NUMBERS OF EARTHQUAKES FELT AT THE DIFFERENT METEOROLOGICAL OBSERVATORIES AND RAIN-GAUGE STATIONS IN FORMOSA.

1904—1907.

Station. \ Year.		1904	1905	1906	1907	*Sum.*
天送埤	Tensohi	5	16	8	10	31
宜蘭	Giran.	19	19	23	41	79
鼻頭角	Bitokaku	2	2	2	3	7
社寮島	*Sharyoto (Keelung)	5	5	4	6	20
基隆	Keelung	1	1	2	3	5
金包里	Kinpori	0	7	4	2	9
富基角	Fukikaku	1	1	2	1	3
暖々街	Dandangai	1	1	1	0	2
火燒寮	Kashoryo	—	—	—	—	—
石底	Sekitei	8	7	8	6	21

TABLE II. *(Cont.)*

Station. \ Year.		1904	1905	1906	1907	*Sum.*
坪林尾	Hyorinbi	1	0	5	3	4
石碇	Sekitei	1	1	2	4	6
屈尺	Kussyaku	0	0	5	0	5
頂內埔	Chonaiho	9	4	14	7	20
臺北	*Taihoku	9	12	10	11	45
双峻頭	Soshunto	0	0	3	1	1
淡水	Tansui	2	1	2	4	7
銅鑼圈	Doraken	0	0	4	3	3
三角湧	Sankakuyo	1	1	3	3	5
白沙岬	Hakushako	9	4	5	5	18
大湖口	Taikoko	1	0	2	0	1
咸菜硼	Kansaiho	2	4	5	3	9
內灣	Naiwan	11	8	9	—	19
樹杞林	Jukirin	7	8	24	19	34
新竹	Shinchiku	2	0	1	2	4
南庄	Nansho	0	0	3	1	1
苗栗	Byoritsu	4	3	6	0	7
大湖	Taiko	1	2	14	2	5
罩蘭	Hekiran	1	6	12	2	9
後里庄	Korisho	2	0	15	1	3
臺中	*Taichu	10	24	40	10	87
水底寮	Suiteiryo	3	5	6	0	8
北港溪	Hokkokei	1	0	4	3	4
埔里社	Horisha	4	7	14	4	15
南投	Nanto	9	12	14	4	25

TABLE II. *(Cont.)*

Station. \ Year.		1904	1905	1906	1907	*Sum.*
社頭	Shato	6	18	38	9	33
竹頭	Rochikuto	5	14	—	1	20
々街	Shushugai	3	12	—	3	18
轆轤	Goonroku	8	5	13	2	15
天半小	Shohanten	3	9	29	3	15
內林	Rinnai	15	8	91	17	40
庫土	Doko	13	12	—	5	30
樹毛生	Seimoju	6	18	—	36	60
崎頭竹	Chikutok	3	19	—	65	87
義嘉	Kagi	25	33	—	19	77
社邦達	Tatsunasha	2	2	—	4	8
田公	Koden	5	8	—	10	23
港水鹽	Ensuiko	6	2	—	0	8
埔大前	Zentaiho	16	14	110	22	52
埔大後	Gotaiho	8	7	—	26	41
眻吧咩	Tabani	12	8	—	5	25
仙甲	Kosen	—	4	24	0	—
濃荖上	Rono	3	0	32	2	5
庄南	Nansho (Tainan Prefecture)	15	18	69	8	41
南臺	*Tainan	9	8	42	11	71
洞龜	Kito	13	6	26	10	29
薯薯蓁	Banshoryo	14	1	5	4	19
威新	Shin-i	4	3	20	0	7
水深	Shinsui	5	1	11	2	8
緱阿	Ako	6	1	—	5	12

Fig. 1. Map of Formosa, showing the Frequency of Sensible Earthquakes during the year 1904.

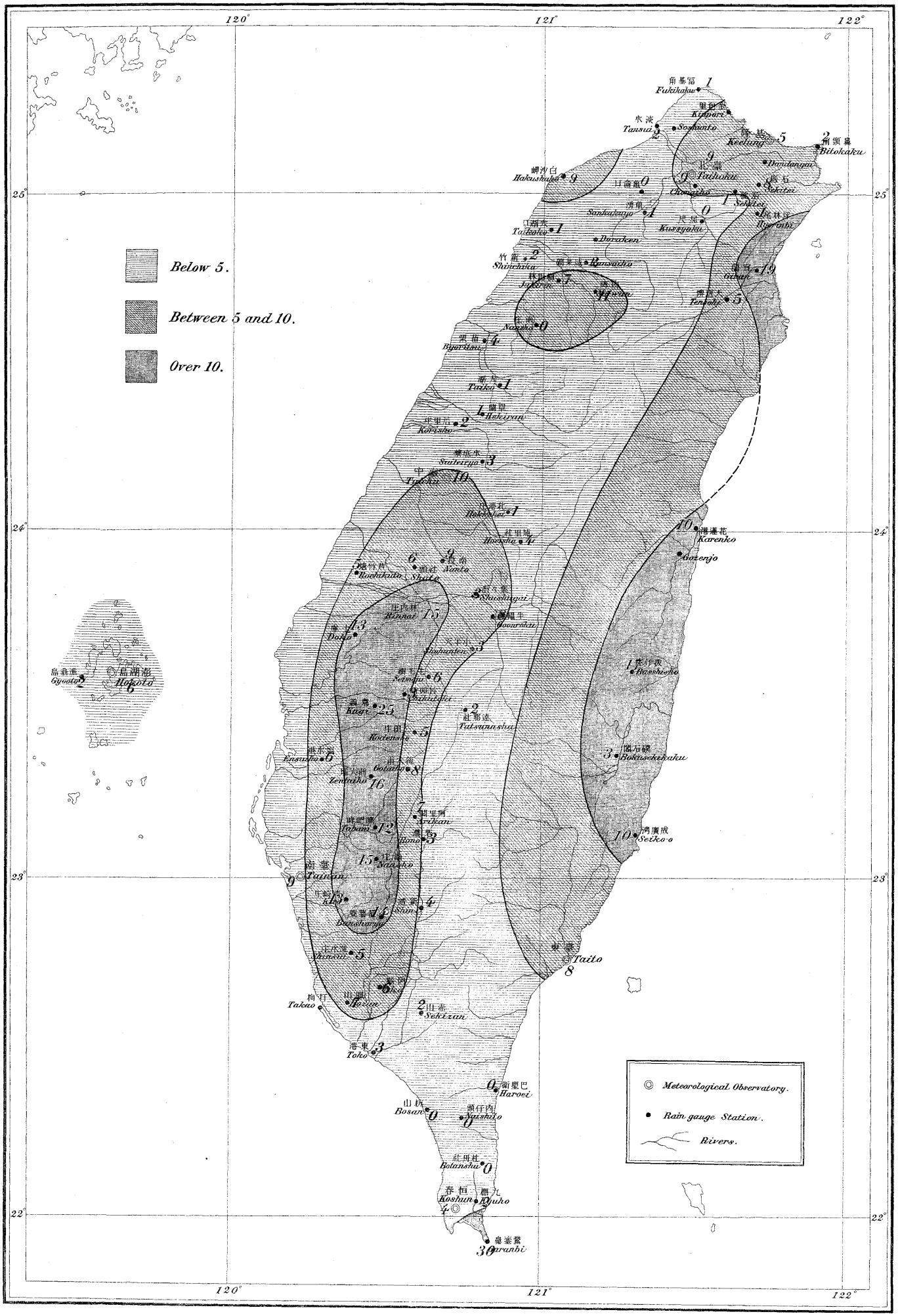

Fig. 2. Map of Formosa, showing the Frequency of Sensible Earthquakes during the years 1904, 1905, and 1907.

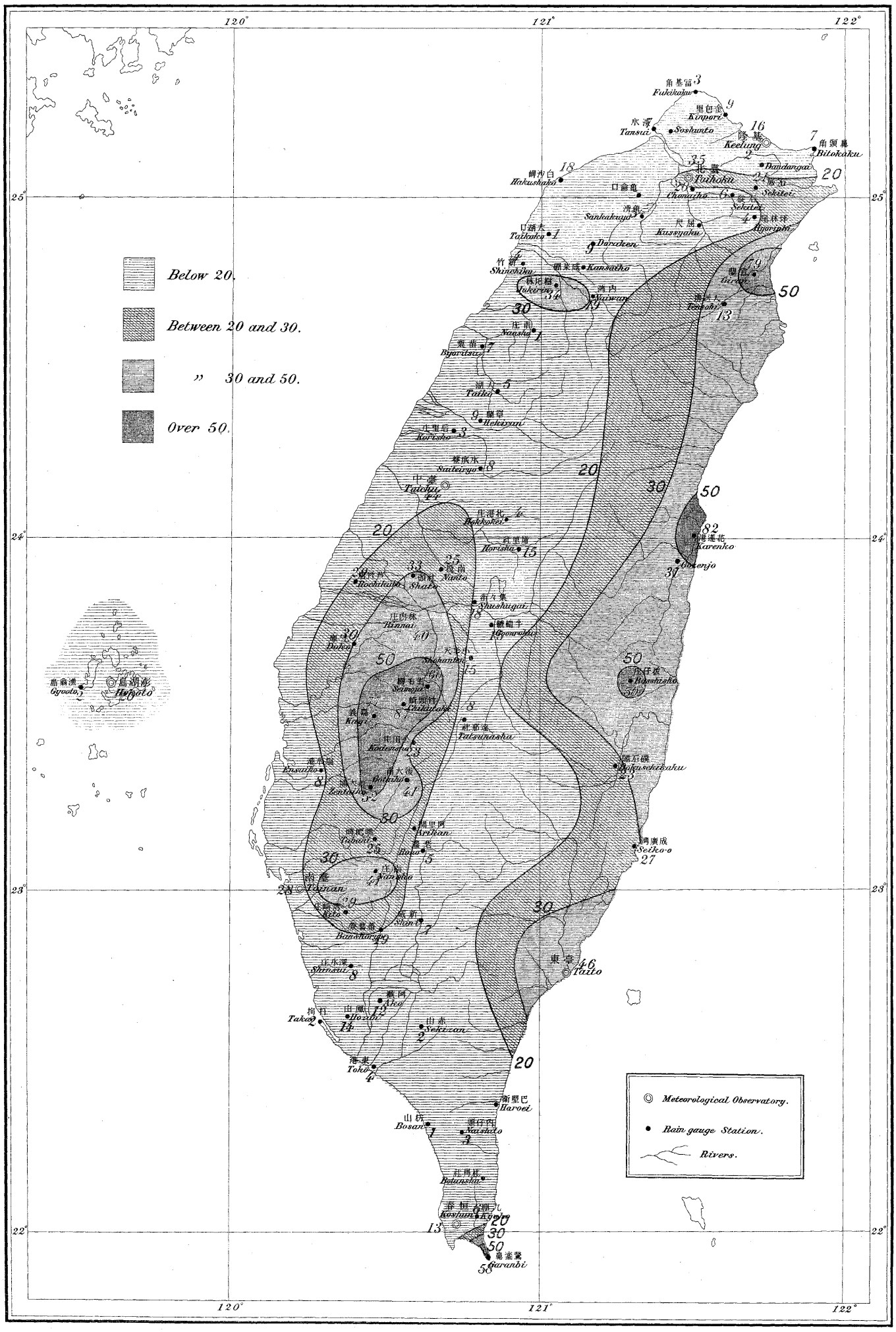

TABLE II. *(Cont.)*

Station. \ Year.		1904	1905	1906	1907	*Sum.*
鳳山	Hozan	7	3	2	4	14
打狗	Takao	2	0	7	0	2
赤山	Sekizan	2	0	5	0	2
東港	Toko	3	0	7	1	4
內仔頭	Naishito	0	1	0	2	3
枋山	Bosan	0	0	0	1	1
恒春	*Koshun	4	3	11	6	26
鷲鑾鼻	Garanbi	30	17	12	11	58
九棚	Kyuho	2	4	2	0	6
牡丹社	Botansha	—	—	—	—	—
巴塱衛	Haroei	0	0	2	—	—
臺東	*Taito	8	32	21	6	79
成廣澳	Seiko-o	10	6	2	11	27
璞石閣	Bokusekikaku	3	19	0	1	23
秧仔庄	Basshisho	17	28	21	5	50
吳全城	Gozenjo	0	26	16	5	31
花蓮港	Karenko	10	50		22	82
澎湖島	*Hokoto	6	4	19	10	37
漁翁島	Gyooto.	2	0	17	0	2

2. ***Earthquake frequency in 1904.*** The seismic frequency during the year 1904 at the different places in Formosa is shown in Fig. 1 (Pl. XXXIII). From the latter there are seen to be four principal regions of seismic activity, as follows :—

(*a*) A nearly north-south zone, extending in the south-western part from the vicinity of Shato and Toroku to that of Banshoryo.

(*b*) Vicinity of Giran, near the northern end of the eastern coast.

(*c*) The eastern coast, between Karenko and Seiko-o.

(*d*) A limited portion about Cape Garanbi at the southern extremity of the Island.

Although Fig. 1 is a map showing the seismic frequency and therefore does not necessarily indicates the distribution of the origins of disturbances, the zone (*a*) seems on the whole to coincide with the main longitudinal earthquake zone in the south-western part of Formosa.* The northern prolongation of (*a*) passes approximately through the local centres at the vicinity of Jukirin and Taihoku and that of Hakushako at the north-western end of the Island. (*b*), (*c*), and (*d*) belong probably to a continuous zone, their higher seismic frequencies being due to the disturbances which occur along or off the eastern coast.

3. ***Earthquake frequency in 1904-1907.*** To obtain a general idea of the seismic distribution in Formosa for the interval, 1904 to 1907, I give in the last column of Table II the sum of the earthquakes recorded during the three years 1904, 1905, and 1907; the frequency for the year 1906 having been excluded on account of the great number of the after-shocks of the destructive disturbance, which took place on March 17th of that year. As is illustrated in Fig. 2 (Pl. XXXIV), the principal centres of the seismic activity, in which more than 50 shocks were felt during the 3 years in question, were as follows:—

(*A*) Kagi and the vicinity.

(*B*) The vicinity of Giran.

(*C*) „ „ Karenko.

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* See F. Omori: "Preliminary Report on the Formosa Earthquake of March 17, 1906." The *Bulletin*, Vol. I, No. 2.

(*D*) The vicinity of Basshisho.
(*E*) Cape Garanbi.

In broad features, Fig. 1 is similar to Fig. 2, and the local centres denoted by (*a*), (*b*), (*c*), and (*d*) in the preceding § are respectively identical with (*A*), (*B*), (*D*) and (*E*), here described. (*B*), (*C*), (*D*), and (*E*) may be regarded as forming a seismic zone which is situated on the eastern side of the axis, or main mountain chain, of Formosa, passing along the longitudinal valley separating the latter from the Taito coast range.* (*A*) forms the most active seat of seismic disturbances of inland origin.

* See also the next Article.