GOVERNMENT NOTIFICATION.—No. 141.

The following Report of the Director of the Observatory, on Results of Barometric Observations made during 25 Years in Hongkong, is published for general information.

By Command,

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Colonial Secretary's Office, Hongkong, 24th April, 1886.

RESULTS OF BAROMETRIC OBSERVATIONS MADE DURING 25 YEARS IN HONGKONG.

The following table exhibits the monthly mean barometric pressure as observed at the Harbour Office, 1861–1883 inclusive, and at the Observatory, 1884–1885 inclusive. Corrections have been applied for index-errors of the barometers and the readings have been reduced to 32° Fahrenheit at Mean Sea Level but not to gravity at 45° latitude.

Similar observations have been, for many years, made at the Hospital, of which the monthly means were also published in the *Gazette*, but owing to an erroneous manner of recording these observations they are not reliable.

The barometer was changed at the Harbour Office at the end of 1863 and in 1874. The index errors of those barometers were determined at the Observatory but I have not been able to learn anything about the one in use before 1863. No regular account was, however, kept of alterations in or repairs done to the instruments, and the following results are in consequence rather uncertain.

The hours of the observations adopted were 6 a., Noon, and 6 p. from January, 1861 to July, 1873 inclusive; 10 a., Noon, and 4 p. from August, 1873 to July, 1876 inclusive; 9 a., Noon, and 3 p. from August, 1876 to December, 1880 inclusive; 10 a. and 4 p. from January, 1881 to December, 1883 inclusive; and hourly readings in 1884 and 1885. No correction for barometric tide was called for as moreover marine barometers in which the tide is diminished, were used at the Harbour Office.

Most of the means were taken in 1883 and early in 1884.

The following formula for calculating the height of the barometer, B, in inches, at any time of the year ϕ expressed in degrees assuming the whole year to correspond to 360°, counting from the middle of December, was obtained from the monthly means:

$$B = 29.953 + 0.236 \cos.(\phi - 31°) + 0.012 \cos.(2\phi - 352°).$$

The epochs of the highest and lowest barometer are obtained by differentiation of this equation The epochs of quickest change by double differention.

Assuming: $B = B_0 + B_1 \cos.(\phi - \epsilon_1) + B_2 \cos..(2\phi - \epsilon_2)$.

We obtain: $\frac{dB}{dQ} = -B_1 \sin.(\phi - \epsilon_1) - 2 B_2 \sin.(2\phi - \epsilon_2) = 0$

Substituting:

$$\text{tg.}(\phi - \tfrac{1}{2}\epsilon_2) = X \text{ , tg.}(\epsilon_1 - \tfrac{1}{2}\epsilon_2) = a \text{ and } 4\frac{B_2}{B_1} \text{ sec.}(\epsilon_1 - \tfrac{1}{2}\epsilon_2) = b.$$

we obtain: $X^4 - 2a X^3 + (1 + a^2 - b^2) X^2 - 2a X + a^2 = 0.$

This equation has four roots, positive or negative according as a is positive or negative, but in either case two are imaginary.

Practically, however, the maximum and the minimum are obtained by trial. Thus the maximum 30.194 was found to occur about the 9th of January, and the minimum 29.719 about the 23rd July.

The monthly means reduced to 45° latitude are exhibited below and compared with the monthly means issued from Zi-ka-wei, near Shanghai, which are based on observations made from 1873 to 1884 inclusive. The latter were reduced to sea level and to 45° latitude:

Month.	*Zi-ka-wei.*	*Hongkong.*	*Difference.*
January,	30.337	30.116	+ 0.221
February,	.266	.069	.197
March,	30.172	30.007	.165
April,	29.995	29.892	.103
May,	.852	.788	.064
June,	.747	.708	.039
July,	.682	.677	.005
August,	.726	.680	.046
September,	29.893	.762	.131
October,	30.103	29.928	.175
November,	.237	30.052	.185
December,	30.307	30.102	+ 0.205
Year,	30.026	29.898	+ 0.128

It appears that the mean height of the barometer is greater in Zi-ka-wei than in Hongkong during every month of the year, but that the difference increases from July, when the heights are on an average nearly equal, till January.

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Hongkong Observatory, 22nd April, 1886.

MEAN BAROMETRIC PRESSURE IN HONGKONG, (1861-1885 INCLUSIVE).

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Means.
1861,	30.104	30.160	30.094	29.983	29.886	29.844	29.814	29.755	29.806	29.991	30.103	30.156	29.975
1862,	30.234	30.243	30.159	.983	.906	.796	.739	.759	.901	30.031	30.102	.189	30.003
1863,	30.263	30.163	30.111	.991	.870	.775	.738	.694	.870	30.049	30.187	.205	29.993
1864,	29.956	29.966	29.984	.754	.720	.576	.608	.604	.734	29.932	30.049	.102	.832
1865,	30.120	29.952	29.992	.864	.785	.655	.659	.620	.590	.814	29.939	.007	.833
1866,	30.046	29.943	29.865	.831	.686	.588	.662	.646	.611	.847	30.011	.095	.820
1867,	30.081	30.001	29.889	.802	.613	.620	.612	.632	.617	.930	.161	.158	.843
1868,	.105	.067	30.008	.930	.894	.650	.744	.686	.813	.957	.050	.126	.919
1869,	.157	.095	29.923	.919	.813	.707	.725	.738	.807	.891	.104	.075	.913
1870,	.096	.079	29.945	.871	.768	.791	.668	.689	.748	.909	.036	.048	.887
1871,	.063	.044	30.038	.897	.816	.709	.732	.691	.764	.864	.059	.181	.905
1872,	.133	.136	29.991	.919	.823	.762	.729	.698	.839	29.940	.078	.060	.926
1873,	.127	.142	30.093	29.938	.820	.737	.719	.803	.739	30.006	.154	.161	.953
1874,	.214	.134	30.059	30.024	.804	.824	.744	.781	.855	30.012	.187	.152	.983
1875,	.180	.139	30.042	29.904	.850	.755	.669	.681	.788	29.889	.051	.134	.923
1876,	.138	.046	29.975	29.864	.875	.826	.739	.752	29.878	30.051	.088	.177	.951
1877,	.257	.202	30.137	30.034	.866	.825	.758	.762	30.007	.127	.184	.175	30.028
1878,	.300	.278	.237	.094	.938	.853	.910	.927	29.872	.027	.147	.193	.065
1879,	.248	.188	.152	.053	.930	.894	.841	.884	.882	.095	.108	.201	.040
1880,	.261	.179	.202	.102	.960	.853	.797	.808	.927	.053	.259	.317	.060
1881,	.306	.202	.260	30.040	.992	.896	.808	.800	.928	30.017	.130	.223	.050
1882,	.267	.243	.202	29.985	.850	.773	.715	.713	.852	29.972	.119	.164	29.988
1883,	.187	.157	.054	.944	.859	.799	.745	.792	.935	30.112	.091	.228	.992
1884,	.211	.181	.027	.985	.866	.775	.694	.738	.798	.034	.113	.238	.972
1885,	.223	.153	.107	.954	.877	.784	.736	.727	.864	.023	.175	.154	.981
Mean,	30.171	30.124	30.062	29.947	29.843	29.763	29.732	29.735	29.817	29.983	30.107	30.157	29.953