between Jukussina and Yonesawa, I first found large bamboo plantations near the last place, about 1000 feet above sea-level, and 37° 55′ N. Between here and Niigata the temperature of the coldest month must differ by about 3°, the latter place being situated near the sea. This gives about 30° F. for Yonesawa, or about the same as at Yusawa. Now in Great Britain, the mountainous districts excepted, the mean temperature of the coldest month is nowhere lower than 36°. A. WOEIKOF

St. Petersburg, December 19, 1880

IN my letter (vol. xxiii. p. 194) I inadvertently stated that Sequoia cones were composed of from 16 to 20 scales. I intended to say 16 to 50, which appears to be the maximum number in either of the existing species. J. S. G.

Chalk

THE objections urged by Mr. S. N. Carvalho, jun. (vol. xxiii. p. 194), to Wallace's explanation of the deposition of chalk must have occurred to every geological reader of "Island Life." There are very many other objections to it, and I trust to be permitted to call attention to them in the *Geological Magazine*, as they are probably too purely geological to interest the readers of NATURE.

J. S. G.

Average Height of Barometer in London

IT was stated in your "Meteorological Notes" a week or two ago in regard to the paper by Mr. H. S. Eaton on the average height of the barometer in London, that "the series is sufficiently extended as to entitle it to be considered one of the most valuable we possess in dealing with questions of secular meteorological variation."

Regarding it in the same light I have thought it worth while to apply Mr. Meldrum's method for discovering the existence and character of the secular variation in the sun-spot cycle. Taking the period 1811–79 I find the following figures for the mean cycles:—

LONDON

Annual Barometric Abnormals, Mean Cycles

	Maximum years in fifth line.		Maximum years in seventh line.	
	Pressure (1811–77)	Sun-spots (1811–77).	Pressure (1816–79).	Sun-spots (1816–72).
1.	+0·006	−33·9	−0·005	+23·3
2.	+ ·016	−23·4	− ·001	+14·5
3.	+ ·013	0·0	− ·001	+ 4·8
4.	− ·002	+28·2	− ·003	− 5·6
5.	− ·010	+43·1	− ·005	−19·0
6.	− ·011	+34·2	− ·001	−32·5
7.	− ·007	+16·8	± ·000	−37·1
8.	+ ·001	+ 0·2	+ ·011	−25·4
9.	± ·000	−14·2	+ ·021	+ 1·8
10.	+ ·001	−24·2	+ ·010	+30·9
11.	± ·000	−26·3	− ·003	+44·8

The variation of pressure, though not so regular as that I worked out for St. Petersburg in 1879, is of an almost exactly opposite character, the minimum pressure appearing as in India, about the time of maximum sun-spot, and the maximum pressure lagging two years behind the epoch of minimum sun-spot. These results agree with the known annual rainfall variation in the same cycle, which is likewise similar in character to that which occurs in the tropics. I would suggest that the marked difference between the results for London and St. Petersburg possibly arises from the close communication between England and the tropics through the medium of Atlantic oceanic and atmospheric currents. E. DOUGLAS ARCHIBALD

January 4

Experiments with Vacuum Tubes

IN my letter published in the last number of NATURE I omitted to say that we have compared vacuum tubes without electrodes with a tube containing water. A tube was filled about nine-tenths full of water and then sealed hermetically. It was then applied to the prime conductor of the electric machine and electrified in the same way as the vacuum-tubes without electrodes, and it was found to behave precisely as they did. The water tube became charged as a double Leyden jar, positive outside and negative inside at the end next the prime conductor, and negative outside and positive inside at the other end. A great tendency to rupture of the glass was also observed. So far as we have been able to see the most perfect vacuum that I have been able to obtain with the Sprengel pump has behaved as to frictional electricity precisely as a perfect conductor such as water.

These experiments seem interesting in connection with the discoveries of Mr. Crookes as to the properties of a very perfect vacuum. No doubt it was known that flashes can be obtained within vacuum tubes without electrodes; but the properties of a perfect vacuum as a conductor of electricity has not been hitherto sufficiently investigated. J. T. BOTTOMLEY

Physical Laboratory, the University, Glasgow, January 8

Oxidation of Quinine, &c.

IN the Chemical Society's *Journal* for December, 1880, there is an abstract of a paper by Hoogewerf and Van Dorp, published in *Liebig's Annalen*, cciv. 84-118, in which the authors describe experiments on the oxidation of quinine, quinidine, cinchonine, and cinchonidine. As reference is made in this paper to our work upon the same subject in such a manner as to lead to the inference that we had copied Hoogewerf and Van Dorp, we beg to call attention to the dates of publication of the various memoirs relating to the matter.

In the Berlin *Berichte*, x. 1936 (close of 1877), Hoogewerf and Van Dorp published a preliminary note on the oxidation of aniline, toluidine, and quinine, and stated that they had obtained amongst other products of oxidation of quinine a nitrogenous acid, to which apparently they attached little importance. Of this acid they gave no further account. At that time we were working at the same subject, and had come to some important conclusions.

As Hoogewerf and Van Dorp's results contained nothing relating to quinine in addition to what had been observed by Cloez and Guignet many years previously, we did not consider that they were entitled to claim that this field of work should be reserved for them. We therefore sent our paper to the Chemical Society, before which it was read on January 19, 1878 (see also Berlin *Berichte*, xi. 324). In this paper we stated that the acid obtained by us from quinine was probably identical with dicarbopyridenic acid. That the acid was a pyridenic acid we had no doubt, but owing to the difficulty of purification we had not been able to establish its formula with certainty.

In the Berlin *Berichte*, xii. 158-161, was published a second paper by Hoogewerf and Van Dorp (read before the Berlin Chemical Society on January 27, 1879), on the acid obtained from quinine, giving no analyses, but stating that the acid was *tri-* and not *di*carbopyridenic acid, thus confirming our result in its important bearing, viz. the connection between the quinine and pyridine series. In the same paper they suggested that an acid obtained by them from quinidine and cinchonine was identical with the quinine acid.

Immediately on receipt of the number of the Berlin *Berichte* containing Hoogewerf and Van Dorp's paper, we forwarded to the secretary of the Chemical Society our second memoir, which contained numerous analyses of the acid obtained, not from quinine only, but also from the allied alkaloids, quinidine, cinchonine, and cinchonidine, together with a full description and analysis of all its important salts. That paper was read before the Society on February 20, 1879.

In *Liebig's Annalen*, cciv. 84-118 (July 31, 1880), or a year and a half after the publication of our second paper, Hoogewerf and Van Dorp published analyses of the acid and many of its salts, prepared from three alkaloids, the results confirming our own in all points.

Our claim, which the above dates fully substantiate, is to have been the first to establish the connection between the quinine and pyridine series, and to have proved that the four alkaloids all gave the same oxidation product.

Prof. Butlerow of St. Petersburg, immediately on appearance of our first paper, when engaging in work closely connected with, but not overlapping ours, wrote suggesting that we should

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