

it was repeatedly met with by us. There were, however, two points of difference between Mr. Copeland's position and ours. We unfortunately knew from the first what the cross-reference was for, and Mr. Copeland did not: we did not know that Mollweide was not the author, and Mr. Copeland, having read NATURE, did.

The hint is further let slip that something in Poggen-dorf "might have given a clue to the authorship." All I can answer is that at least two librarians looked up Mollweide in Poggen-dorf, and were not erratic enough to think of the clue. Indeed, the main part of my original letter has been written in vain if I have failed to make clear that at first we did not seek for "a clue to the authorship," Baltzer having so cruelly misled everybody by asserting in the usual matter-of-fact way that the author was Mollweide. And what I wanted to insist upon was the following simple canon—*Never, so long as books are catalogued as at present, insert without comment an author's name in a title where no author's name exists.*

THOMAS MUIR.

Bothwell, Glasgow, February 11.

### Cause of September Typhoons in Hong Kong.

AN investigation of the average distribution of atmospheric pressure in South-Eastern China and neighbouring regions has proved the existence of a trough of relatively low pressure in the channel between Formosa and Luzon, and in the northern part of the China Sea during September. This appears to be the reason why typhoons so frequently enter the China Sea during that month of the year, and cause north-east veering to south-east gales to be felt in Hong Kong. Like storms that visit the British Isles, they move along between two areas with higher pressures, and are sometimes developed under the influence of those areas. This remark would be of considerable value in forecasting typhoons in Hong Kong if the district round the China Sea were better furnished with telegraphic reporting stations than it is at the present time.

W. DOBERCK.

Hong Kong Observatory, January 11.

### The Composition of Water by Volume.

IN my paper "On the Composition of Water by Volume" (Proc. R. S. 1887, 398) the ratio 1:994 volumes of hydrogen to 1 volume of oxygen was given as the most probable value, as I assumed that both gases were of an equal degree of purity. The ratio 1:9967:1 was given from the best six experiments if the impurity be supposed to be altogether in the oxygen. At the last meeting of the British Association (B.A. Trans., 1887, 668) I pointed out that this was the most probable ratio, as I had found the impurity to be chiefly oxides of carbon arising from the combustion of traces of the vaseline used in lubricating the stop-cocks finding their way into the eudiometer. Dr. Sydney Young's interesting and ingenious letter (p. 390) is a most valuable corroboration of the hypothesis that the impurity is almost entirely due to the oxygen. A new and larger apparatus, enabling me to use twice the volume of gas, and to measure with much greater accuracy the residue, as well as make a complete analysis of it, still gives a ratio of less than 2:1, as the four last experiments made with it show.

	Measured volumes.			Residue.			Combining volumes.			Ratio.
	H	O	H	CO <sub>2</sub>	C	N	H	O		
I.	6909'4	3451'2	... 38'9	7'2	7'9	0'7	6370'5	3440'1	... 1'9972:1	
II.	6882'2	3414'2	... 74'9	2'6	5'3	3'6	6807'3	3409'0	... 1'9968:1	
III.	7657'2	3798'7	... 63'3	—	—	0'8	7593'9	3798'7	... 1'9980:1	
IV.	7561'4	3777'9	... 19'9	—	—	0'7	7541'5	3777'9	... 1'9962:1	

In Experiments I. and II. vaseline was used as the lubricant, and in III. and IV. syrupy phosphoric acid, by using which all traces of the oxides of carbon are eliminated, and the gases shown to be of a high degree of purity. If we allow that half the amount of oxygen which was used to burn the carbon would be required in addition to burn the hydrogen combined with it in the vaseline, then the ratio becomes 2:1.

To use phosphoric acid as a lubricant with security, I find it is necessary to use safety-taps, and am having them in place of the ordinary ones now on my apparatus, and hope very shortly to settle beyond all doubt the true ratio in which hydrogen and oxygen combine to form water.

The ratios of the CO and CO<sub>2</sub> in Experiments I. and II. recall Bunsen's experiments.

ALEXANDER SCOTT.

Durham, February 27.

### Water Supplies and Reservoirs.

HAVING observed in NATURE (p. 375) an article on the drought of past years, and the probability of one this year also, from deficient rainfall, I take the occasion of suggesting that the old reservoirs might still be made more available for an additional storage of water to counteract its effects. As there is always abundance of rainfall, 40 inches, in Lancashire, and on its surrounding hills, from the cities of which district come complaints of want of water supplies, no fear need be entertained of lack of water if the rain could be all impounded without loss.

It has appeared to me surprising that our hill reservoirs have not been excavated deeper into the valleys and ravines they are made out of, after the manner of the water tanks in India.

In this country a reservoir seems to be simply formed by making a rampart across a ravine, and letting the upper part fill itself, as it stands naturally, with rain in course of time.

The ravine still lies encumbered with sodden grass, stumps of trees, rotting herbage, old walls, and fences, with organic remains, and submerged under the impounded lake, so that an emptied reservoir looks like a long mud ditch, through which a flood or a sea tide had lately passed.

Now if the sides were cut down perpendicularly, and the bottoms levelled horizontally, such valley reservoirs would be able to contain twice as much water as they now do, on the principle that the area of a rectangle is twice as great as that of a triangle between the same parallels.

The whole area of the reservoir might possibly be excavated cleanly out, so as to have its sides and bottom as good as any wet dock in a seaport, and our water supplies would then be considered quite sufficient, and of better quality, for the great towns. If this were done, say, for Liverpool and Manchester, there might be found less need for constructing new and distant waterworks, as the present reservoirs when thus enlarged would hold nearly double the amount they now do.

Besides the lessened rainfall, all reservoirs must suffer serious loss by evaporation, especially in dry seasons, and this is not occasioned so much by the sun's heat as by the action of drying winds, which may carry off as much as 0'20 inch per diem, or 6 inches in a month, or more than an average monthly rainfall. To counteract this tendency, belts of trees planted round the margins of reservoirs are found very useful in sheltering the surface of the waters from the winds, and they act beneficially besides in attracting rain itself to the pools. Further, on the same idea it might be found advisable to cover over entirely the head tanks for city supply, with sheds or roofs, so as to keep off the sun's rays from the water; or else to erect a high screen on the windward side to keep the prevailing winds off the surface, and counteract unnecessary evaporation.

Edinburgh.

W. G. BLACK.

### A Photographic Objective.

MY attention was called some time since to a letter from Prof. Pickering in your issue of October 13, 1887 (vol. xxxvi. p. 562), describing a form of objective adaptable either to photographic or visual work, by reversion of crown lens and alteration of its distance from the flint.

The form described is exactly similar to that which had been suggested to me by the President of the Royal Society, and which I reported on at the June meeting, 1887, of the Royal Astronomical Society, as having been actually constructed and found to give good results (see *Observatory*, No. 125, pp. 253 and 254).

I should perhaps have mentioned this matter before, but thought that Prof. Pickering would certainly have seen the published account of my previous communication. I have, however, lately seen a newspaper report that a patent has actually been granted for this form of objective.

It therefore appears necessary to point out that this form had been previously suggested by Prof. Stokes, and put in actual practice here.

I may mention that long previous to Prof. Pickering's communication, I had arranged with the Astronomer-Royal to construct the new 28-inch objective for Greenwich Observatory on this principle on certain conditions, and also that this particular form of photographic objective has a distinct place in the last edition of my catalogue.

HOWARD GRUBB.

Rathmines, Dublin, February 27.