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XLII. Abstract of meteorological observations made at St. Petersburg, in 1830, at the Astronomical Observatory

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When discharged of their *acquired* electricity, they remain attached to the anti-electric plates, and thus assume the counteracting character above mentioned, obstructing the current in proportion to the quantity collected on the surface of the plates (32). But when there is free acid, it no sooner comes in contact with the zinc, than it begins to act upon it, and the zinc, in the act of dissolution, gives out positive electricity to the liquid; *i. e.* in the direction of the current (40), thus balancing, or more commonly overcoming, the neutralizing influence of the negative liquid particles (42), whilst they act with their full effect in exalting the copper: and hence the superiority of acid charges (23).

The reader will perceive that the theory of two fluids is most conformable to these views. It has not been insisted on, because not fully received in this country, nor quite free from ambiguity in its application.

XLII. *Abstract of Meteorological Observations made at St. Petersburg, in* 1830, *at the Astronomical Observatory. By* MM. Wisniewsky *and* Tarkhanof; *and calculated by Professor* M. A. Kupffer*.

IN the following observations the thermometer is divided according to Reaumur, and the barometer into French inches. The barometric heights have been reduced to the temperature of 14° of Reaumur, and the months are reckoned according to the New Style.

Table I. *Containing the Mean of the Thermometric Observations for every Month of* 1830.

Months.	7h A.M.	2h P.M.	9h P.M.	Means.
	°	°	°	°
January.. ...	− 9·46	− 8·03	− 8·44	− 8·64
February ...	8·54	6·55	7·24	7·45
March.....	− 4·59	− 1·13	− 3·25	− 2·99
April.....	+ 0·83	+ 4·30	+ 1·18	+ 2·10
May	4·46	7·76	3·86	5·36
June	11·59	14·67	10·89	12·38
July	13·11	15·73	12·66	13·83
August.....	13·16	16·65	12·65	14·15
September...	6·08	10·77	7·33	8·06
October.....	+ 3·17	5·68	3·86	4·24
November...	− 0·36	+ 0·72	+ 0·28	+ 0·21
December....	− 4·76	− 3·64	− 4·11	− 4·17
Means.....	+ 2·6	+ 4·74	+ 2·47	+ 3·09

According to the tables communicated by Dr. Brewster†, we

* Communicated by Professor Kupffer.

† Edinb. Journal of Science, for June 1826.

must subtract 0°·11 from the mean results found above, in order to have the mean temperature of the year. We shall then have

The mean temperature of the year 1830... +2°·98 Reaum.
Or ..... 38°·705 Fahr.

I need not remind the reader, that the table given by Dr. Brewster is probably applicable only to Scotland and to similar climates. I have employed it here because we do not yet possess for St. Petersburg meteorological observations executed upon the model of those which have been made with so much perseverance at Leith, under the care of Dr. Brewster.

TABLE II. *Extreme Variations of the Octogesimal Thermometer for every Month of* 1830, *and the Maximum of the Difference for each Month, between two Observations of the same Day.*

Months.	Maximum of Temperature at 2h P.M.	Minimum of Temperature at 7h A.M.	Difference.	Greatest Diff. between two Observations of the same Day.
	°	°	°	°
January.....	− 1·2	−19·2	18·0	6·8
February	+ 0·3	16·5	16·8	7·7
March	4·3	17·9	22·2	7·2
April	13·2	− 5·2	18·4	9·9
May	16·0	0·0	16·0	7·5
June	22·0	+ 8·1	13·9	8·8
July	23·8	8·3	15·5	6·5
August	24·0	9·4	14·6	8·0
September...	14·5	+ 1·1	13·4	9·5
October.....	12·7	− 2·2	14·9	7·4
November...	6·3	9·5	15·8	4·0
December...	+ 1·2	−12·1	13·3	7·1

This table does not give the greatest variations of temperature in the course of a month, or during 24 hours. We must admit that the maxima of temperature take place at 2h P.M. But for the minima we know that they occur a few instants after sunrise; so that at 7h A.M. the temperature during the greatest part of the year is considerably above the minimum.

TABLE III. *Mean of Barometrical Observations made at* 7h A.M., 2h P.M., *and* 9h P.M., *for every Month of the Year* 1830.

Months.	Barometric Height in French Inches.	Months.	Barometric Height in French Inches.
January ...	28·454	July	28·044
February..	28·025	August....	27·937
March ...	28·077	September..	28·212
April	28·073	October....	27·991
May	28·160	November..	28·315
June.....	28·056	December..	28·051

Mean barometric height for 1830.....28·116 inches.

TABLE IV.—*Extreme Variations of the Barometer at the Hours of Observation for each Month of* 1830.

Months.	Maximum.	Minimum.	Difference.
	In.	In.	In.
January ...	29·14	27·75	1·39
February...	28·67	26·93	1·74
March	28·83	27·33	1·50
April.....	28·55	27·48	1·07
May.....	28·51	27·47	1·04
June.....	28·64	27·53	1·11
July.....	28·46	27·70	0·76
August.....	28·17	27·70	0·47
September..	28·60	27·78	0·82
October.....	28·41	27·17	1·24
November..	28·99	27·36	1·63
December..	29·01	27·26	1·79
Means	28·67	27·46	1·21

TABLE V.—*State of the Winds whose Direction was observed Three Times a Day, at* 7^h A.M., 2^h P.M., *and* 9^h P.M.

Months.	North.	North East.	East.	South-East.	South.	South-West.	West.	North-West.	Calm.
Jan. ...	1	14	0	8	13	41	12	0	4
Feb. ...	7	18	4	11	7	33	2	1	1
March.	0	7	4	6	29	38	8	0	1
April...	1	13	2	10	14	43	2	0	5
May ...	8	27	1	6	5	25	17	1	3
June ...	4	18	9	5	9	27	11	0	7
July ...	7	13	2	6	7	40	12	4	2
August	0	4	5	14	15	41	8	0	6
Sept. ...	11	23	11	1	13	16	3	3	9
Oct. ...	12	19	3	12	10	30	1	2	4
Nov. ...	3	11	2	14	24	31	2	0	3
Dec. ...	2	8	0	13	48	15	3	0	4
Sums.	56	175	43	106	194	380	81	11	49

TABLE VI.—*Mean Height of the Barometer for each Wind.*

Winds.	Mean Height of Barometer.	No. of Observations.	Winds.	Mean Height of Barometer.	No. of Observations.
	In.			In.	
North.....	28·091	56	South-West	28·085	380
North-East	28·229	175	West.....	28·142	81
East.....	28·156	43	North-West	28·142	11
South-East	28·071	106	Calm.....	28·256	49
South.....	28·025	194			

General Observations.—Strong and very strong winds occurred on the following days: February 9, (New Style,) South-east; March 12, 13, 18, 30, South; March 31, South-west;

April 5, South; May 8, North-west; April 14, South; December 27, South.

In the course of the year 1830, there were at St. Petersburg:—90 days of rain; 68 days of snow; 10 days of thunder; 58 days during which the sky was entirely covered from morning till night; 218 days during which the sky was cloudy during the greatest part of the day; 143 days of fog (these fogs were commonly produced in the morning, but less frequently in the evening, and they very seldom lasted beyond noon); and 28 days during which the sky was entirely clear from morning till night.

The last frost took place on the 4th of May.—The first frost on the 14th of October.

The thermometer rose above zero,

For the first time on the 27th of February;—and for the last time on the 28th of December.

The day of the flood on the Neva, 21st of April.—The day of its being shut up, 1st of December.

Auroræ Boreales.—These meteors appeared on the evenings of the following days:—Feb. 24th; March 18th; May 5th; Sept. 13, 17, 18, and 19; Oct. 18 and 22; and Dec. 8 and 15.

XLIII. *On the Inflexion of Light. By* John Barton, *Esq.**

SOME time ago I had the honour to submit to the Royal Society an account of a variety of experiments and observations on the inflexion of light, which seemed to me strongly to indicate that light consists of material particles, endued with a force of mutual repulsion†. I have since had the satisfaction to find that the possibility of explaining the phænomena of inflexion by the help of the same principle had suggested itself to the mind of Sir David Brewster‡. In the paper just mentioned, I did not enter into any discussion respecting the theories of Young and Fresnel,—contenting myself with a simple detail of the results of my own experiments, accompanied by such explanatory observations as seemed needful to connect them together, and render them intelligible; but I wish now to state some considerations which appear to me to be decisive against those theories.

The fundamental principle common to them both is this:—If two equal waves, moving in opposite directions, come into collision, they will destroy each other, and all further movement will cease; whereas, if they coincide in their direction,

* Communicated by the Author.

† An abstract of the paper here alluded to was given in Phil. Mag. and Annals, N.S. vol. x. p. 300: it has also been noticed by Prof. Powell, in vol. xi. p. 2.—Edit. ‡ Life of Newton, p. 105.