



Philosophical Magazine Series 3

ISSN: 1941-5966 (Print) 1941-5974 (Online) Journal homepage: http://www.tandfonline.com/loi/tphm14

XXXII. Observations on the relative temperature of the sea and air, and on other phænomena, made during a voyage from England to India

J.H. Pratt M.A.

To cite this article: J.H. Pratt M.A. (1840) XXXII. Observations on the relative temperature of the sea and air, and on other phænomena, made during a voyage from England to India, Philosophical Magazine Series 3, 16:102, 176-181, DOI: 10.1080/14786444008650015

To link to this article: http://dx.doi.org/10.1080/14786444008650015



Published online: 01 Jun 2009.



Submit your article to this journal 🕑





View related articles 🗹

Full Terms & Conditions of access and use can be found at http://www.tandfonline.com/action/journalInformation?journalCode=3phm20

[176]

XXXII. Observations on the relative Temperature of the Sea and Air, and on other Phænomena, made during a Voyage from England to India. By the Rev. J. H. PRATT, M.A., Member of the Asiatic Society of Bengal.

To the Editors of the Philosophical Magazine and Journal.

GENTLEMEN,

I SEND you the accompanying observations on the relative temperature of the sea and the superincumbent air made at various latitudes and longitudes on a voyage from England to India, in case you should deem them of sufficient importance to give them a place in your valuable Magazine.

I regret that they do not extend through the whole voyage. It was not till after passing the Cape that I recorded any observations. I was anxious to see what effect the Mozambique Channel had upon the currents; and after that I continued my observations up to the Bay of Bengal.

I have also given the result of a few observations on the velocity of the waves of a swell in unfathomable water.

Once or twice I attempted to ascertain the temperature of the sea water at a considerable depth, such as 40 and The method I adopted was this: I sunk a 100 fathoms. quart bottle, full of sea-water and well-corked, by means of a line, and allowed it to remain a considerable time (as an hour or more), that the water within the bottle might attain the temperature of the surrounding water by conduction. I then drew it up with great rapidity (perhaps in 11/2 minute), instantly uncorked the bottle, and tried the temperature. When I poured the water into a glass it would change its temperature very little in 5 or 10 minutes; so I felt assured that no great change could have taken place in its passage from its lowest depth. I should have made more of these observations, but the utter impracticability of sinking a bottle well, except in a dead calm, prevented this. One day I had a bottle 200 fathoms deep for one or two hours; a gentle breeze sprang up, my bottle towed astern, and in pulling it in the line broke!

A notice of my observations will be seen in the accompanying tables of temperature.

I am, Gentlemen, yours, &c.

Bishop's Palace, Calcutta, March 22, 1839.

JOHN HENRY PRATT.

Results of a Series of Experiments on the Temperature of the Sea, made by J. H. PRATT, M.A., on board the ship Duke of Buccleugh, bound for Calcutta.

Dor	Lat.	Long.	Uour	Temperature.		General Remarks
Day.	at noon.	at noon.	nour.	Sea.	Air.	General Remarks.
1838.	.	• •			0	
Nov. 17.	37 37 S.	20 40E.	11 p.m.	6 ⁹ ·25	66	
18.	37 40	24 14	101	64.25	64·25	Clear sky.
19.	37 54	$28 \ 30$	9 a.m.	65	68	Clear.
			10½ p.m.	69·25	64.50	Cloudy.
20.	37 46	33 42	8 a.m.	63.75	59	Clear.
			3 p.m.	64.75	61	
			11	69.75	62·50	Clear (starlight).
21.	38 11	37 51	7 a.m.	68.25	64	Clear.
			9	68.25	64.25	Clear.
			noon.	66.25	64	
			2 p.m.	64.50	64.50	Clear.
-			5	62.20	62.50	Violent squall.
1			7	62·50	57	Immediately after
		I				heavy rain.
			81	62	58) bet. squalls.
			10	62	58	Cloudy.
		_	midnight.	62	56	Starlight.
22.	37 55	42 20	$5\frac{1}{2}$ a.m.	67	58	Cloudy.
			$7\frac{1}{2}$	67.25	58	
	1		9	67.25	58	
			101/2	68	59	~
			noon.	67	59	Clear.
			2 p.m.	$65\frac{1}{2}$	59	a 1
			5	59.75	61.20	Sea became
			7	58	59	
			9	55.25	55.25	- J green: pass-
			1			ing through
						comp. shal-
				a a	FO	Iow water.
	0 - 10	45 4	11	62 05 05	58 50	Clear.
23.	37 46	47 4	4 a.m.	65.25	59 C0	Clear.
			73	04'00	00 F0.05	Clauder
		ł	9	63.90	09.20 60	Cloan
		1	11	00 62.50	61.75	Utean.
				62.50	64.50	
			2,3 p.m.	63.50	64.50	
			42	63.50	64	
			01	63 00	63.50	Cloudy.
		1	101	63	63.50	0.0uuj.
			104	63	62.50	
24	38 14	51 50	71 am	64.75	64	Cloudy.
~		0.00	Q	63.25	64.50	
			101	63.25	65	
			121 n.m.	63	65.50	Clear.
	<u> </u>	I	1 1 2 2 F.m.	<u> </u>	1 00 00	
D1.17	31 0	a 17.1	TO NT	100 1	Amali	1010 N

The experiments were begun on the east of the Cape.

Phil. Mag. S. 3. Vol. 16. No. 102. March 1840.

177

D		1	Lat.		long.	TT	Temperature.		Bomanka
Day.	•	at	noon.	at	noon.	Hour.	Sea,	Air.	Remarks.
1838	3.		,				0.00		
Nov.	24.	38	14 S.	51	50 E.	_2p.m.	63.50	66	Clear.
						5	64	67.50	
						$8\frac{1}{2}$	62	64	Cloudy.
						$10\frac{1}{2}$	61	63	
						12	62	64	
9	25.	37	5 5	57	20	12 p.m.	61.50	63.20	Clear.
	26.	- 38	48	62	2	8 a.m.	60.25	60	Cloudy.
						10	60	61	Clear.
						2 p.m.	60.75	62.75	
				ļ		5	60.50	60.50	Cloudy.
						7	60.50	59.50	Clear.
						10	60.50	59	Cloudy.
						12	60.25	60	
2	27.	38	48	64	0	8 a.m.	60	55.75	Rain.
	•					noon.	60	56.50	
						10 p.m.	60.50	59	Cloudy.
						12 p.m.	60	56	
9	28.	38	21	67	50	7½ a.m.	59	55.50	
						2 p.m.	58.75	56	Clear.
ł						10 1	59	56.50	Cloudy.
	29.	37	2	70	35	8 a.m.	59.25	57	
]						10월	59.25	57.75	Clear.
Į						1 p.m.	60	57	
l l						10	59	57	Cloudy.
	30.	37	30	72	5	8 a.m.	58.50	59	,
		- •			Ŭ	2 p.m.	58	61.50	
						6	57.50	59	Rain.
						$10\frac{1}{7}$	57.75	59.25	Cloudy.
Dec.	1.	37	16	77	1	8 a.m.	57	60.75	
				••	-	2 p.m.	58.50	61	Clear.
						8	60	61	Cloudy.
						10+	59.25	61	<u>/</u> -
	2.	36	12	81	8	10 p.m.	59	62.25	
1	3	34	25	82	50	$7\frac{1}{2}$ a.m.	60	62	Fog.
	Ŭ.		-	0.0	- ·	noon.	62.75	66	Cloudy.
						6 p.m.	63	65	
						10	63.20	641	
1	4.	31	27	85	3	7 a.m.	66.25	67	
			.	00		9	66.25	67.50	
	ĺ					2 ¹ / ₂ p.m.	69	71.50	Clear.
						10	67.50	68	
	ļ				İ	12	67.25	67.50	
	5.	28	25	86	37	7 a.m.	68.25	68.50	Clear.
				50	~	9	68.50	69.50	
						11	69	71.25	
	ł					l p.m.	69.25	72	
						3	70.	73	
			1			5	71.	72	
					1	7	71.50	71.50	Cloudy.
	- 1				- I	- 1			•

TABLE continued.

D	Lat.	Long.	TTown	Temperature.		
Day.	at noon.	at noon.	riour.	Sea.	Air.	Remarks,
1838.	0 /	01				
Dec. 5.	28 25 S.	86 37 E.	9 a.m.	71.75	71.50	Clear.
			11	71.50	72	Cloudy.
6.	26 8	88 53	7 a.m.	72.25	71.25	~
			9	72	71.50	Clear.
			11	73	73.75	Cloudy.
			2 p.m.	73.50	73.50	
			5	73.50	73.50	
			10	73.20	72.75	
-	04.04	00.10	10	70 79.75	1% 79.05	
7.	24 24	89 10	9 a.m.	73.75	70.20	
			13 p.m.	74	74.90	Clean
			3	72.50	70.50	Clear.
			10	73-30	73.90	
0	อเอ	QQ 10	10	76.75	73	Cloudy
ъ.	51 Z	03 12	7 a.m.	76.50	74	Cloudy.
			9	70.00	76	Clear
			11 11 n m	78	76.50	Cicuit
			$\frac{12}{5}$ p.m.	77.25	76.50	
			61	76	76.50	
			101	76	75.50	
			12	76	75	
0	17 40	99 45	10 n.m.	79	78+	Cloudy.
9. 10	17 48	80 0	7 a.m.	80	80	
10.	13 99	05 4	9	80.25	79	
	í	·	113	80.50	80.50	Clear.
			5 p.m.	80.50	79.50	Cloudy. (🛱 🖉
			10	80	79	I
						Violent squalls at
11.	10.55	88 30	6 a.m.	79.50	78	Clear. [night.]
	10 00		8	80.25	80	Gale
1	1		noon.	80-25	80	
			10 p.m.	80.25	79	
12.	11 35	88 4	7 a.m.	80	79	Rain and heavy
			10 p.m.	80	80	squalis.
13.	12 0	87 8	10 a.m.	79.75	81	Rain, heavy
			10 p.m.	79.25	78	squalls.
14.	11 30	86 <i>2</i> 8	8 a.m.	80	70	Clean
	[2 p.m.	70.50	70.50	Cical.
		00.40		19.00	79.50	
15.	11 11	86 42	6 a.m.	00	79.50	
			9 10 m	80	80	
10		07 0	12 p.m.	80	80	
16.	10 52	01 0	10 p.m. 7 a.m	80.75	81	
17.	10 8	80 4/	21 n m	81.75	82.50	
			10 × p.m.	81	81	
10	0.40	95 13	71.a.m	81	81.50	
18.	943	00 10	noon.	81	82	
			12 n.m.	8i	80.50	
	}		1% p.m.	U	0000	

TABLE continued.

133. at noon. at noon. four. Sea. Ar. Ar. 1838. \hat{B} 21 S, 85 0E. 7 a.m. 81-25 81-25 Clear. 20. 7 54 85 20 9 a.m. 82-50 84	Dav	Lat.	Long.	1 Tour	Temperature.		Romerka
1838. Dec. 19. 8 21 S, 8 21 S, 20. $85 0$ $7 a.m.85 0$ $81 \cdot 25$ $noon.82 \cdot 50$ $81 \cdot 25$ $82 \cdot 50$ Clear. $$		at noon.	at noon.	Hour.	Sea.	Air.	Reinarka.
20. 7 54 85 20 9 a.m. $82^{5}50$ 82	1838. Dec. 19.	8 21 S	85 ÓE.	7 a.m.	81.25	81.25	Clear,
Act 7 57 65 20 9 a.m. 2 p.m. 10 $\frac{1}{9}$ 84 84 84 84 84 84 97 85 98 98 10 9 9 a.m. 10 $\frac{1}{9}$ 82:50 81:75 92 82:50 83:50 92 82:50 92 9 10 85 93 82:50 92 9 10 85 84 82:50 92 9 10 9 10 10 10 9 10 9 <td>20.</td> <td>7 54</td> <td>85 90</td> <td>noon.</td> <td>82.50</td> <td>84</td> <td>sunk for an hour</td>	20.	7 54	85 90	noon.	82.50	84	sunk for an hour
21. 7 29 85 18 9 m. 82 9 m. 10 $\frac{1}{3}$ 84 84 moon, with the prometh to gate 50 moon, with the prometh to gate 50 25. 1 56 87 0 10 moon, with the gate 50 82 moon, with the gate 50 moon, with sign 50 moon, with 50	1 ~	101	00 20	poon.	82.90	82.50	thoms (about
21. 7 29 85 18 9 a.m. 81-75 84				2 n m	84	84	noon), when
21. 7 29 85 18 9 a.m. noon. 2 p.m. 26. 85 18 1 56 9 a.m. noon. 2 p.m. 26. 85 18 1 6 9 a.m. noon. 2 p.m. 26. 3550 1 6 $$ 2 b. 100 2 p.m. 26. $$ 1 6 $$ 1 10 p.m. 2 p.m. 26. $$ 2 b. 100 2 p.m. 27. $85 18$ 29. $7 a.m.$ 29. $87 0$ 29. $7 a.m.$ 29. $84 25$ 29. $84 25$ 29. $84 25$ 29. $84 25$ 29. $82 25$ 29. $7 a.m.$ 20. $84 25$ 29. $82 250$ 29. $82 250$ 20.				101	81.75	84	81°.50 temp.
25. 1 56 87 0 100 n. 83 82:50 \longrightarrow Bottle sunk 100 fathoms. 26. 1 6 87 0 10 p.m. 83:50 81:25 Clear. 27. 29'S. 87 0 7 a.m. 84 81 2 p.m. 85 82:25 Clear. Clear. 27. 29'S. 87 20 7 a.m. 84 83 82:25 Clear. Clear. 28. 24'N. 88 25 7 f.a.m. 84:25 82:25 Cloudy ; bottle sunk 100 f. 70°. 30. 4 14 91 8 noon. 83 83 82 30. 4 14 91 8 noon. 83 83 82 31.1. 4 10 91 28 7 a.m. 82:50 82 Cloudy ; bottle sunk 100 f. 70°. 1839. 13 2 88 50 2 p.m. 82:50 82 Cloudy ; bottle sunk 100 f. 70°. 18. 13 2 88	21.	7 29	85 18	9 a.m.	82.50	82	of water.
25.156870 2 p.m.8583:50 -5 Temp. 78°.26.168707a.m.848127.29'S.8720 $7\frac{1}{7}$ a.m.848127.29'S.8720 $7\frac{1}{7}$ a.m.848228.24'N.8825 $7\frac{1}{7}$ a.m.848229.1308916 $7\frac{1}{7}$ a.m.848229.1308916 $7\frac{1}{7}$ a.m.83:5082108382 $7\frac{1}{7}$ a.m.83:508230.414918 $10\frac{1}{7}$ p.m.82:50821839.10838383838329.1308916 $7\frac{1}{7}$ a.m.82:50821839.1088502 p.m.80:508012 p.m.115088502 p.m.80:5080141091287 a.m.82:508212 p.m.13288578 a.m.8079799.13548998 a.m.807910.142288358 a.m.8178:5010.142288578 a.m.817911.14598823noon.80:507811.14 <td< td=""><td></td><td>-</td><td></td><td>noon.</td><td>83</td><td>82.50</td><td></td></td<>		-		noon.	83	82.50	
25. 1 56 87 0 10 p.m. 83.50 81.25 Clear. 26. 1 6 87 0 7 a.m. 84 81 9 27. 29'S. 87 20 $7_7 a.m.$ 84 82 82.25 Clear. 27. 29'S. 87 20 $7_7 a.m.$ 84.25 82.25 Clear. 28. 24'N. 88 25 $7\frac{1}{7} a.m.$ 84 83 82 29. 1 30 89 16 $7^{+}_{7} a.m.$ 83 25 82 Cloar. 30. 4 14 91 8 10 $7\frac{1}{7} a.m.$ 83.25 82 cloark 100 f. 70°. 1839. 30. 4 14 91 28 7 a.m. 82.50 82 cloark 100 f. 70°. 1839. 30. 4 10 91 28 7 a.m. 82.50 82 cloark 100 f. 70°. 1839. 30. 4 10 91 28 7 a.m. 82.50 82 cloark 100 f. 70°. 19. moon. 80.50 81 10 80 80 81				2 p.m.	85	83.50	
20.168707a.m.848127.29'S.8720 $7\frac{1}{7}$ a.m.858427.29'S.8720 $7\frac{1}{7}$ a.m.84-2582-2528.24'N.8825 $7\frac{1}{7}$ a.m.848328.24'N.8825 $7\frac{1}{7}$ a.m.848329.1308916 $7\frac{1}{7}$ a.m.838230.4149181083.50821839.1012 p.m.82-5082sunk 100 f. 70°.1839.1012 p.m.82-5082sunk 100 f. 70°.1839.1085502 p.m.80-50807.115088502 p.m.80-50808.13288578 a.m.807910.142288358 a.m.807910.142288358 a.m.807910.142288358 a.m.807811.14598823noon.80-507812.15578858 a.m.807914.172088109 a.m.77-7577-7515.181588558 a.m.7571-7516.20498847noon.7	25.	1 56	87 0	10 p.m.	83.20	81.25	Clear.
27.29'S.8720 $\begin{pmatrix} 2 \\ 10 \\ 10 \\ 7^{+} a.m. \\ 84 \\ 2^{+} p.m. \\ 85 \\ 2^{+} p.m. \\ 85 \\ 2^{+} p.m. \\ 85 \\ 82 \\ 5^{+} 2^{+} p.m. \\ 84 \\ 83 \\ 82 \\ 2^{+} p.m. \\ 84 \\ 83 \\ 82 \\ 82 \\ 82 \\ 82 \\ 82 \\ 82 \\ 82$	20.	16	87 0	7 a.m.	84	81	
27. 29'S. 87 20 $7\frac{1}{7}$ a.m. $2\frac{1}{7}$ p.m. $2\frac{1}{7}$ p.m. $2\frac{1}{7}$ p.m. $84 + 25$ $82 \cdot 25$ $85 \cdot 25$ Clear. 28. 24'N. $2\frac{1}{7}$ p.m. $2\frac{1}{7}$ p.m. $2\frac$			1	2 p.m.	85	84	Dain and couple
28. 24' N. 88 25 $7\frac{1}{7}$ a.m. $84^{3}25^{3}$ $82^{3}25^{3}$ Clean. 28. 24' N. 88 25 $7\frac{1}{7}$ a.m. 84 83 29. 1 30 89 16 $7\frac{1}{7}$ a.m. 84 83 29. 1 30 89 16 $7\frac{1}{7}$ a.m. 83 $\frac{1}{2}$ 82 30. 4 14 91 8 noon. 83 84'50 1839. 10 $\frac{1}{2}$ p.m. 82'50 82 sunk 100 f. 70°. Jan. 1. 4 10 91 28 7 a.m. 82'50 82 1839. 11 50 85 50 2 p.m. 80'50 80 Cloudy ; bottle sunk 100 f. 70°. 1839. 10 88 50 2 p.m. 80'50 80 Clear. 7. 11 50 88 50 2 p.m. 80'50 81 Clear. 9. 13 54 88 9 8 a.m. 80 79 6 p.m. 80'50 78 10. 14 22 88 35 8 a.m. 81 78'50 78'50 11. 14 59 <td>27.</td> <td>29'S</td> <td>87 20</td> <td>10 71 a m</td> <td>84</td> <td>79</td> <td>Cloar</td>	27.	29'S	87 20	10 71 a m	84	79	Cloar
28. $24'$ N. 88 $25'$ p.m. $30'$ $30'$ $81'$ 22 $81'$ $82'$ 29. 1 30 89 16 $7\frac{1}{7}$ a.m. 84 $83'$ $82'$ 30. 4 14 91 8 $10'$ p.m. $83'$ $82'$ $82'$ 30. 4 14 91 8 $10'$ p.m. $83'$ $82''$ $82''$ $82''$ 8	~	~~	0, 20	$q_{\overline{y}}a.m$	84.20	82.25	Clear.
28. 24' N. 88 25 $7\frac{1}{5}$ a.m. $2\frac{1}{2}$ p.m. $30.$ 4 14 91 8 $83\frac{1}{2}$ $10\frac{1}{2}$ p.m. $30.$ 4 14 91 8 $10\frac{1}{2}$ p.m. $30\frac{1}{2}$				10 2 p.m.	84	03.29	
29. 1 30 89 16 $2\frac{1}{2}$ p.m. 10 84 83 82 82 30. 4 14 91 8 $10\frac{1}{2}$ p.m. 10 83 50 82 62 Cloudy ; bottle sunk 100 f. 70°. exp. well made. 1839. 10 91 28 7 a.m. 12 p.m. 82*50 82 Cloudy ; bottle sunk 100 f. 70°. exp. well made. 7. 11 50 88 50 2 p.m. 10 80*50 80 8. 13 2 88 57 8 a.m. 80 80 79 9. 13 54 88 9 8 a.m. 10 80 78 9. 13 54 88 9 8 a.m. 10 80 78 10. 14 22 88 35 8 a.m. 10 p.m. 80:50 78 78 11. 14 59 88 23 noon. 10 p.m. 80:50 78 77 12. 15 57 88 5 8 a.m. 10 p.m. 77:75 77 77 14. 17 20 88 10 9 a.m. 77:50	28.	24' N.	88 25	7-a.m.	84	801	
29.1308916 $7\frac{1}{7}$ a.m. $83\frac{1}{5}$ 8230.414918noon.8384-501839.12 p.m.82*508282Jan.1.41091287 a.m.82*50827.115088502 p.m.80*5080Cloudy ; bottle sunk 100 f. 70°.8.13288578 a.m.80799.13548898 a.m.80799.13548898 a.m.807910.142288358 a.m.8178*5010.142288358 a.m.8178*5011.14598823noon.80*507811.14598823noon.80*507811.145988109 a.m.77*7577*7515.181588558 a.m.707614.172088109 a.m.77*7577*7515.181588558 a.m.77*7577*7515.181588578 a.m.75*507617.Mouth ofHoogly.8 a.m.7571*5076				$2\frac{1}{2}$ p.m.	84	83	
29.1308916 $7\frac{1}{7}a.m.$ 8350 82 30.414918noon. $83 \cdot 25$ 82 1839.12p.m. $82 \cdot 50$ 82 $84 \cdot 50$ Jan.1.41091287 $a.m.$ $82 \cdot 50$ 82 7.115088502p.m. $80 \cdot 50$ 80 7.115088502p.m. $80 \cdot 50$ 80 8.13288578 $a.m.$ 80 79 9.13548898 $a.m.$ 80 79 9.13548898 $a.m.$ 80 79 9.142288358 $a.m.$ 80 79 10.142288358 $a.m.$ 81 11.14598823noon. $80 \cdot 50$ 78 11.14578858 $a.m.$ $77 \cdot 75$ 12.15578858 $a.m.$ $77 \cdot 75$ 14.172088109 $a.m.$ $77 \cdot 75$ 15.181588558 $a.m.$ $77 \cdot 75$ 15.18158858 $a.m.$ $77 \cdot 50$ 78 16.20498847noon. $77 \cdot 50$ 73 17.Mouth of<	l _			10	831	82	
30.414918 $10\frac{1}{2}p.m.$ noon. 12 $83\cdot25$ 82 82 82 82 82 82Cloudy ; bottle sunk 100 f. 70°. exp. well made.1839. Jan. 1.41091287n.m. 82:5082 82Cloudy ; bottle sunk 100 f. 70°. exp. well made.7.115088502p.m. 80:5080 80Clear.8.13288578 a.m. 8080 8079 1p.m. 80:5081 10 80Clear.9.13548898 a.m. 8080 79 6 p.m. 10 108079 85078:50 81 1010.14228835 88 a.m. 80:5081 78:50 78 8111.14598823 10 p.m. 10 p.m. 10 p.m. 80:5078 78 78 78 78 78 78 78 78 78 77:7577:75 77:7515.1815 8858 88 9 9 9 814.1720 88810 9 9 a.m. 10 9 9 9 9 9 9 9 10 9 77:7577:75 77:75 77:7515.1815 883 9 9 8 871.00 77:5015.1815 883 8 3 471.5016	29.	1 30	89 16	$7\frac{1}{2}$ a.m.	83.50	82	
30.414918noon. 12 p.m. 83 $82 \cdot 50$ $82 \cdot 50$ 82 Cloudy ; bottle sunk 100 f. 70°. exp. well made.1839. Jan. 1.41091287 a.m. 10 $82 \cdot 50$ 82 Cloudy ; bottle sunk 100 f. 70°. exp. well made.7.115088502 p.m. $2 p.m.$ $80 \cdot 50$ 80Clear.8.13288578 a.m. $80 \cdot 79$ 80799.13548898 a.m. $80 \cdot 79$ 80799.13548898 a.m. $80 \cdot 79$ 78 \cdot 5010.142288358 a.m. $80 \cdot 79$ 78 \cdot 5010.142288358 a.m. 10 p.m. 80 \cdot 5011.14598823noon. 10 p.m. 80 \cdot 5012.15578858 a.m. 10 p.m. 77 \cdot 7514.172088109 a.m. $77 \cdot 75$ 77 \cdot 7515.181588 558 a.m. 10 p.m. 76 \cdot 507316.20498847noon. 10 p.m. 75 < 71 \cdot 50			1	10 ¹ / ₂ p.m.	83.25	82	
1839. Jan. 1.141091287 $a.m.$ 82.5082Cloudy ; bottle sunk 100 f. 70°. exp. well made.7.115088502 $p.m.$ 82.5082exp. well made.7.115088502 $p.m.$ 80.5080Clear.8.132885788mon.80799.135488988mon.80799.135488988799.1354889887910.14228835887910.14228835887811.14598823noon.80-507812.1557885881010.10p.m.77.7577.7577.7515.18158855881501077.7577.7577.757615.181588578815016.20498847noon.77.507817.Mouth ofHoogly.8a.m.7571.50	30.	4 14	91 8	noon.	83 [·]	84.20	on 1 11
1839. Jan. 1.4 1091 287 a.m. a.m.82:5082 82 83sunk 100 f. 70°. exp. well made.7.11 5088 502 p.m. 80 5080Clear.8.13288 578 a.m. 108079 80 799.13 5488 98 a.m. 80 798079 1 p.m. 80 5081 809.13 5488 98 a.m. 80 798079 109.14 2288 358 a.m. 80 7980 7878 50 8010.14 2288 358 a.m. 81 78 5078 50 1011.14 5988 23 10 p.m. 10 p.m. 10 p.m. 10 p.m.80 50 81 7812.15 5788 58 a.m. 10 p.m. 10 p.m. 10 p.m. 10 p.m. 80 50 7814.17 2088 10 10 p.m. 10 p.m. 10 p.m. 77 75 77 7515.18 15 20 4988 47 8 a.m. 10 p.m. 76 50 10 p.m. 76 50 73 71 50	1000	1		12 p.m.	82.50	82	Cloudy; bottle
Jan.1.41091257 $n.m.$ 82:5082exp. weu made.7.115088502 $p.m.$ 80:5080Clear.8.13288578a.m.80799.13548898a.m.80799.13548898a.m.80799.135488988.m.80799.1422883588.m.807910.1422883588.m.8178:5010.1422883588.m.8178:5011.14598823noon.80:507812.155788588.m.807914.172088109a.m.77:7577:7515.18158855881.5081:5016.20498847noon.77:507617.Mouth ofHoogly.887.507371:50	1839.	4 10	01 00	-			sunk 100 f. 70°.
7. 11 50 88 50 10 83 83 83 83 83 83 83 83 83 83 83 80 Clear. 8. 13 2 88 57 8 a.m. 80 79 1 mon mon 80 79 1 mon	Jan. 1.	4 10	91 20	7 a.m.	82.50	82	exp. weu made.
8. 13 2 88 57 8 a.m. 80 50 80 10 80 80 10 80 80 10 80 80 10 80 80 10 80 80 10 80 80 10 10 80 80 79 11 10 80 80 79 10 10 80 79 10 80 79 10 80 79 10 80 79 10 80 79 10 80 79 10 80 79 10 80 79 10 80 79 10 80 79 10 80 78 80 78 80 78 80 78 80 78 80 78 80 78 80 78 80 79 10 80 50 78 80 80 79 10 80 50 78 81 10 80 80 79 10 80 70 77 77 77 77 77 <t< td=""><td>7.</td><td>11 50</td><td>88 50</td><td>10</td><td>83</td><td>83</td><td>Clear</td></t<>	7.	11 50	88 50	10	83	83	Clear
8. 13 2 88 57 10 80 79 9. 13 54 88 9 8 a.m. 80 79 9. 13 54 88 9 8 a.m. 80 79 9. 13 54 88 9 8 a.m. 80 79 9. 13 54 88 9 8 a.m. 80 79 10. 14 22 88 35 8 a.m. 80 78 10. 14 22 88 35 8 a.m. 81 78:50 10. 14 59 88 23 noon. 80:50 78 11. 14 59 88 23 noon. 80:50 78 11. 14 59 88 23 noon. 80:50 78 12. 15 57 88 5 8 a.m. 70 78 14. 17 20 88 10 9 a.m. 77.75 77.75 <t< td=""><td>•</td><td></td><td>00 00</td><td>» р.ш.</td><td>80.90</td><td>80</td><td>Cicai.</td></t<>	•		00 00	» р.ш.	80.90	80	Cicai.
9. $13 54$ $88 9$ 10 10 $80 50$ 81 10 $80 798 a.m.$ $80 796 p.m.$ $80 50$ $78 5010$ 80 $796 p.m.$ $80 50$ $78 5010$ 80 $796 p.m.$ $80 50$ $78 5010$ 80 $796 p.m.$ $80 50$ $78 5010$ 80 $7811.$ $14 22$ $88 35$ $8 a.m.$ 81 $78 5010 p.m.$ $80 50$ $7810 p.m.$ $80 50$ $7810 p.m.$ $80 50$ $7810 p.m.$ $80 50$ $7811.$ $14 59$ $88 23$ noon. $80 50$ $8110 p.m.$ $80 50$ $7810 p.m.$ $80 50$ $7810 p.m.$ $80 50$ $7810 p.m.$ $80 50$ $8110 p.m.$ $80 50$ $8110 p.m.$ $79noon.$ 80 $8110 p.m.$ $78 787910 p.m.$ $78 50$ $81 5010$ $77 75$ $77 752\frac{1}{2} p.m. 78 50 81 5010$ $77 75$ $77 75$ $77 7575$ $77 75$ $77 7515.$ $18 15$ $88 55$ $8 a.m.$ $77 50$ $7816.$ $20 49$ $88 47$ noon. $77 50$ $7610 p.m.$ $76 50$ $7317.$ Mouth of Hoogly. $8 a.m.$ 75 $71 50$	8.	13 2	88 57	8 a.m	80	70	
9. $13 54$ $88 9$ 10 10 80 79 8 a.m. 80 $7910 80 7910 80 7910 80 796 p.m.$ $80 50$ $78 5010 80 7810 80 796 p.m.$ $80 50$ $78 5010 80 7810 80 7810 p.m.$ $80 50$ $7810 p.m.$ $81 25 8010 p.m.$ $80 50$ $7811.$ $14 59$ $88 23$ noon. $80 50$ $8110 p.m.$ $80 50$ $7812.$ $15 57$ $88 5$ $8 a.m.$ $80 79noon. 80 50 7812.$ $15 57$ $88 5$ $8 a.m.$ $80 50$ $7810 p.m.$ $77 75$ $7814 17 20$ $88 10$ $9 a.m.$ $77 75$ $77 752\frac{1}{2} p.m. 78 50 81 5010$ $77 75$ $77 752\frac{1}{2} p.m. 78 50 81 5010$ $77 75$ $77 75$ $77 7575 77 75$ $77 7575 77 75$ $77 7575 77 75$ $77 7515.$ $18 15$ $88 55$ $8 a.m.$ $77 50$ $7810 p.m.$ $76 50$ $7317.$ Mouth of Hoogly. $8 a.m.$ 75 $71 50$				1 p.m.	80.50	81	
9. 13 54 88 9 8 a.m. 80 79 10. 14 22 88 35 8 a.m. 80 79 10. 14 22 88 35 8 a.m. 81 78.50 10. 14 22 88 35 8 a.m. 81 78.50 10. 14 22 88 35 8 a.m. 81 78.50 10. 14 59 88 23 noon. 80.50 78 11. 14 59 88 23 noon. 80.50 78 12. 15 57 88 5 noon. 80.50 78 12. 15 57 88 5 8 a.m. 80 79 14. 17 20 88 10 9 a.m. 77.75 77.75 15. 18 15 88 55 8 a.m. 77.50 78 16. 20 49 88 47 nooon. 77.50 76				10	80	79	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	9.	13 54	88 9	8 a.m.	80	79	
10.14228835				noon.	80	79	
10. 14 22 88 35 10 80 78 10. 14 22 88 35 8 a.m. 81 $78 \cdot 50$ noon. $81 \cdot 25$ 80 10 $p.m.$ $80 \cdot 50$ 78 11. 14 59 88 23 noon. $80 \cdot 50$ 10 $p.m.$ $80 \cdot 50$ 81 12. 15 57 88 5 8 a.m. 80 12. 15 57 88 5 8 a.m. 80 79 14 17 20 88 10 $p.m.$ $77 \cdot 75$ $77 \cdot 75$ 15 18 15 88 55 8 a.m. $77 \cdot 75$ $77 \cdot 75$ 15 18 15 88 55 8 a.m. $77 \cdot 50$ 78 16 20 49 88 47 noon. $77 \cdot 50$ 76 10 $p.m.$ $76 \cdot 50$ 73 $71 \cdot 50$ 73			1	6 p.m.	80.20	78.50	
10. 14 22 88 35 8 a.m. 81 78-50 noon. 81-25 80 11. 14 59 88 23 noon. 80-50 78 11. 14 59 88 23 noon. 80-50 81 12. 15 57 88 5 8 a.m. 80 79 12. 15 57 88 5 8 a.m. 80 79 14. 17 20 88 10 p.m. 78-50 81 14. 17 20 88 10 9 a.m. 77.75 77.75 15. 18 15 88 55 8 a.m. 77.50 78 16. 20 49 88 47 noon. 77.50 76 17. Mouth of Hoogly. 8 a.m. 75 71.50 71.50				10	80	78	
11.14 5988 2310 p.m. $80 \cdot 50$ 7810 p.m.80 \cdot 507812.15 5788 58 a.m. $80 \cdot 50$ 7812.15 5788 58 a.m.807914.17 2088 109 a.m.77.7577.7515.18 1588 558 a.m.78 5081 5016.20 4988 47100.77.7577.7517.Mouth ofHoogly.8 a.m.7571.50	10.	14 22	88 35	8 a.m.	81	78.50	
11. 14 59 88 23 10 p.m. 80.50 78 11. 14 59 88 23 noon. 80.50 81 12. 15 57 88 5 8 a.m. 80 79 14. 17 20 88 10 9 a.m. 77.75 15. 18 15 88 55 8 a.m. 78 50 16. 20 49 88 47 noon. 77.50 16. 20 49 88 47 noon. 77.50 17. Mouth of Hoogly. 8 a.m. 75 71.50				noon.	81.25	80	
11. 14 59 88 23 100 p.m. 80*50 81 10 p.m. 80*50 78 88 10 p.m. 80*50 78 12. 15 57 88 5 8 a.m. 80 79 noon. 80 81 10 p.m. 78 78 14. 17 20 88 10 9 a.m. 77.75 15. 18 15 88 55 8 a.m. 77.75 77.75 15. 18 15 88 55 8 a.m. 77.50 78 16. 20 49 88 47 noon. 77.50 78 16. 20 49 88 47 noon. 77.50 78 17. Mouth of Hoogly. 8 a.m. 75 71.50 73		14 20	00.00	rop.m.	80.50	78	
12. 15 57 88 5 10 p.m. 80 50 79 noon. 14. 17 20 88 10 9 a.m. 77.75 77.75 15. 18 15 88 55 8 a.m. 79 noon. 80 81 10 p.m. 78 78 78 78 14. 17 20 88 10 9 a.m. 77.75 77.75 15. 18 15 88 55 8 a.m. 77.75 77.75 16. 20 49 88 47 noon. 77.50 78 16. 20 49 88 47 noon. 77.50 78 17. Mouth of Hoogly. 8 a.m. 75 71.50	11.	14 59	88 23	10 n m	80.50	70	
12. 13 37 88 3 6 10 76 78 14. 17 20 88 10 9 a.m. 77.75 77.75 14. 17 20 88 10 9 a.m. 77.75 77.75 15. 18 15 88 55 8 a.m. 77.75 77.75 16. 20 49 88 47 noon. 77.50 76 16. 20 49 88 47 noon. 77.50 78 17. Mouth of Hoogly. 8 a.m. 75 71.50	10	15 54	00 E	8 a.m.	80.90	70	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	12.	15 57	00 0	noon.	80	81	
14. 17 20 88 10 9 a.m. 77.75 77.75 $2\frac{1}{2}$ p.m. 78.50 81.50 10 77.75 77.75 15. 18 15 88 55 8 a.m. 77.50 78 16. 20 49 88 47 noon. 77.50 76 17. Mouth of Hoogly. 8 a.m. 75 71.50 73				10 p.m.	78	78	
15. 18 15 88 55 8 81.50 16. 20 49 88 47 noon. 77.50 78 17. Mouth of Hoogly. 8 a.m. 75.50 73 73 17. Mouth of Hoogly. 8 a.m. 75 71.50	14.	17 20	88 10	9 a.m.	77.75	77.75	
15. 18 15 88 55 8 a.m. 77.75 77.75 16. 20 49 88 47 noon. 77.50 78 16. 20 49 88 47 noon. 77.50 76 17. Mouth of Hoogly. 8 a.m. 75 71.50				2 ¹ / ₂ p.m.	78.50	81.50	
15. 18 15 88 55 8 a.m. 77.50 78 16. 20 49 88 47 noon. 77.50 76 10. p.m. 76.50 73 73 75 71.50 17. Mouth of Hoogly. 8 a.m. 75 71.50				10	77.75	77.75	
16. 20 49 88 47 noon. 77.50 76 10 p.m. 76.50 73 73 17. Mouth of Hoogly. 8 a.m. 75 71.50	15.	18 15	88 55	8 a.m.	77.50	78	
17. Mouth of Hoogly. 8 a.m. 75 71.50	16.	20 49	88 47	noon.	77.50	76	
17. Mouth of Hoogly. 6 a.m. 75 71.50			TT	10 p.m.	76.50	73	
	17.	Mouth of	Hoogly.	o a.m.	15	71.20	

TABLE continued.

I made the following experiment on the velocity of waves out at sea. Lat. $27^{\circ} 2'$ S. Long. $27^{\circ} 25'$ W.

There was a *swell* on the sea moving from fore aft; wind only sufficient to carry the vessel (all sails set) *steadily* two or three miles an hour. Two large floats were connected by a line forty fathoms in length, the line itself being supported on the surface of the water by smaller floats. This apparatus was towed astern by a long line connected with one of the large floats by one end, the other end being wound round a reel.

The chief officer watched the chronometer; the second officer held the reel fixed; and I observed the large floats.

A few seconds before the first float was raised to its greatest height by a given wave, I gave a signal to the second officer to let the reel run, and immediately the floats became stationary in the water.

At the instant the first float, and also at the instant the second float, was raised to its greatest height by the wave already mentioned, I gave audible signals to the chief officer, who marked the interval of time between the signals.

A very good average of many trials gave a trifle less than six seconds of time for the motion of the wave from float to float, i. e. over forty fathoms. This gives nearly $27\frac{1}{3}$ statute miles an hour.

The chief officer and I changed places, and came to the same result. Two days afterwards this was confirmed, though in rather a rough manner, by observing the motion of the vessel by a swell moving abaft.

Calcutta.

J. H. P.

XXXIII. Researches in the Undulatory Theory of Light continued: On the Absorption of Light. By JOHN TOVEY, Esq.

(Continued from p. 455 of last Volume.)

To the Editors of the Philosophical Magazine and Journal.

GENTLEMEN,

YOU will have observed that the formulæ of my last communication are deduced from the fundamental principles of the undulatory theory without the aid of any assumption respecting the arrangement of the molecules, or the nature of the constant quantities, k, &c., which appear in the integration. Those formulæ indicate, as was shown, that the transmission of the light may be accompanied by an absorption, or diminution of its intensity, depending on the nature and thickness of the medium through which it is transmitted,