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We get these equations, when for C_1 we substitute $+q^2$ and $-q^2$ respectively in equation (4) and when we put $C_2 = 0$, and this proves that the solutions of (13) fulfil the condition in question.

In a further paper I hope to prove the two following theorems:

I. If in a region of space ϱ and v are functions of x, y and z, and v satisfies the three following conditions:

1st v and its differential coefficients with respect to x, y and z are everywhere continuous;

2nd with the exception of some points or surfaces in this space

$$\frac{d^2v}{dx^2} + \frac{d^2v}{dy^2} + \frac{d^2v}{dz^2} = q^2 v - 4\pi (A + B) \varrho \ ;$$

3rd the products xv, yv, zv, $x^2 \frac{dv}{dx}$, $y^2 \frac{dv}{dx}$ en $z^2 \frac{dv}{dz}$ are nowhere infinite;

then v is the potential with respect to the point x, y and z of an agens, the density of which is ϱ, while the potential function is expressed by:

$$\varphi(r) = \frac{A e^{-qr} + B e^{qr}}{r} .$$

II. If the same conditions as in I hold for ϱ and v with this modification that $-q^2$ is substituted for q^2 and $A \sin \alpha$ for $A + B$; then v is the potential with respect to point x, y and z of an agens, the density of which is ϱ, while the potential function is expressed by

$$\varphi(r) = \frac{A \sin (qr + \alpha)}{r} .$$

Hydrography. — *Tidal Constants in the Lampong- and Sabang-bay, Sumatra.* By Dr. J. P. VAN DER STOK.

I. *Telok Betong.*

a. From April 23,1897 to April 22,1898 tidal observations have been made in the Lampong-bay on the road of *Telok Betong*, situated in 5° 27′ Lat. S. and 105° 16′ Long. E. at the 6 hours of 8 and 10 a. m., noon 2, 4 and 6 p. m.

As in the eastern parts of Sunda-strait the normal (i. e. oceanic) tides of the Indian Ocean must show a more or less gradual transition to the peculiar tidal régime of the Java-sea, the cotidal lines run here very near to each other, by which reason two places, situated at no great distance may show very different tidal constants. For such stations a simple interpolation with respect to intensity or time of occurrence is not allowed, and the determination of the characterising constants is of great importance because it is the only way of obtaining exact data concerning the manner in which tidal waves progress and mutually interfere.

The observations have been made at the request of Major J. J. A. MULLER of the Topographical Service, who wanted an exact determination of the general water-level in the bay in behalf of the Topographical Survey of South-Sumatra.

b. The constants of the partial tides M_2, O and N have been computed in the ordinary way by arrangement of the records according to the different periods; the constants of the other tides S_1, S_2, K_1, K_2, Sa, Ssa and the value of the general mean W have been calculated by means of the monthly means. The problem, therefore, consisted in computing 15 quantities from 73 equations in the simplest and most advantageous manner; it would have been a tedious work to apply directly to this problem the method of the l. sq. and the results would not have been more accurate than by using the following abbreviated method.

c. The constants of the tides S_1 and S_2, as also the general mean value W, are deduced from the 6 equations given by the hourly means taken over the whole year.

These equations are for the given hours:

$$\left.\begin{array}{lll}
(1) & 8\text{ a.m.} = & W + S_1 \cos(300^\circ - C_1) + S_2 \cos(240^\circ - C_2) \\
(2) & 10\ \text{,,}\ = & W + S_1 \cos(330^\circ - C_1) + S_2 \cos(300^\circ - C_2) \\
(3) & \text{noon} = & W + S_1 \cos C_1 + S_2 \cos C_2 \\
(4) & 2\text{ p.m.} = & W + S_1 \cos(30^\circ - C_1) + S_2 \cos(60^\circ - C_2) \\
(5) & 4\ \text{,,}\ = & W + S_1 \cos(60^\circ - C_1) + S_2 \cos(120^\circ - C_2) \\
(6) & 6\ \text{,,}\ = & W + S_1 \cos(90^\circ - C_1) + S_2 \cos(180^\circ - C_2) \\
\text{Mean:} & & W + 0.644\, S_1 \cos(15^\circ - C_1).
\end{array}\right\} (1)$$

By combination of (1) with (4), (2) with (5) and (3) with (6) S_2 is eliminated, the result is:

$$(1) + (4) = 220.2 \text{ c.M.} = 2S_1 \sin(75^\circ - C_1) \sin 45^\circ + 2W$$
$$(2) + (5) = 219.1\ \text{,,}\ = 2S_1 \sin(105^\circ - C_1) \sin 45^\circ + 2W$$
$$(3) + (6) = 218.7\ \text{,,}\ = 2S_1 \sin(135^\circ - C_1) \sin 45^\circ + 2W$$

These three equations are satisfied by the values:

$$W = 111.17 \text{ cM.}, \quad S_1 = 2.70 \text{ cM.}, \quad C_1 = 207°8'$$

Substituting these values in equations (1), we find, on putting:

$$Y = S_2 \sin C_2, \quad X = S_2 \cos C_2$$

(1)	$0.5\,X + 0.866\,Y = 12.731$ cM.
(2)	$-0.5\,X + 0.866\,Y = 10.801$ „
(3)	$X = 1.634$ „
(4)	$0.5\,X + 0.866\,Y = 12.731$ „
(5)	$0.5\,X + 0.866\,Y = 10.802$ „
(6)	$X = 1.636$ „

and from these

$$(1) + (2) + (4) + (5) = 3.464\,Y = 47.065\,; \quad Y = 13.587 \text{ c.M.}$$

Substituting this value of Y in (1) (2), (4) and (5) we find:

$$X = 1.930 \text{ cM.}$$

and in (3) and (6)

$$X = 1.634 \text{ cM.}$$

The difference is small, but it points to a systematic error, e. g. in the assumption that the diurnal variation may be represented by only two periodic terms instead of by three or more, owing to the somewhat aperiodic description of the influence of land- and seabreezes.

As a final value we take:

$$X = \frac{1.930 \times 4 + 1.634 \times 2}{6} = 1.832 \text{ cM.}$$

$$S_2 = 13.71 \text{ cM.} \qquad C_2 = 82°20'.$$

d. With a view of calculating the constants of the tides K_1 and P the following sums and differences of the monthly means are used.

	a (8)+(10)	*b* (12)+(2)	*c* (4)+(6)	*a—b*	*a—c*
April	210.1	212.6	215.6	— 2.5	— 5.5
May	155.8	218.2	237.5	—62.4	—81.7
June	184.5	247.9	269.4	—63.4	—84.9
July	198.8	263.6	283.9	—64.8	—85.1
August	220.2	290.9	294.8	—70.7	—74.6

	a	b	c		
	(8)+(10)	(12+(2)	(4)+(6)	a—b	a—c
September	218.4	278.5	252.3	—60.1	—33.9
October	203.4	234.7	196.6	—31.3	6.8
November	206.4	212.0	170.4	— 5.6	36.0
December	197.9	182.6	161.6	15.3	36.3
January	210.1	199.2	201.8	10.9	8.3
February	189.2	207.5	217.0	—18.3	—27.8
March	179.9	217.8	231.8	—37.9	—51.9
April	188.8	245.3	231.2	—56.5	—42.4
				(—42.1)	(—32.6)

The differences $(a-b)$ and $(a-c)$ are independent of W, the general mean, of the annual and semi-annual variations and of disturbing influences as far as they may be considered to be the same at the different hours of the day or i. o. w. last for some days.

The influence of S_1 and S_2 is the same for every month, so that the *periodic* variation, which is evident in the differences, is caused exclusively by the tides K_1, P and K_2.

The figures in brackets —42.1 and —32.6 are obtained by combining the two values for the month of April in such a way that to each value is given a weight equal to the number of days of observation resp. 8 and 22.

The series is considered therefore to commence with May 1st, a fact which must be taken into consideration in applying the astronomical argument. Representing the single-periodic variation of the differences $(a-b)$ and $(a-c)$ by the expression:

$$\left.\begin{aligned} a-b &= A\cos 30^\circ x + B\sin 30^\circ x \\ a-c &= A_1\cos 30^\circ x + B_1\sin 30^\circ x \end{aligned}\right\} \quad . \quad . \quad . \quad . \quad (2)$$

we find by the method of the l. sq.:

$$A = -26.58 \qquad B = -28.68$$
$$A_1 = -51.88 \qquad B_1 = -25.62$$

The influence of the tides K_1, P en K_2 in the monthly mean values may be represented by the expressions:

$$\left.\begin{aligned}
&(1)\quad K_1 R_2 \cos(30^\circ x + 315^\circ - C_k) + PR_2\cos(30^\circ x + 75^\circ + C_p)\\
&(2)\quad K_1 R_2 \cos(30^\circ x + 345^\circ - C_k) + PR_2\cos(30^\circ x + 45^\circ + C_p)\\
&(3)\quad K_1 R_2 \cos(30^\circ x + 15^\circ - C_k) + PR_2\cos(30^\circ x + 15^\circ + C_p)\\
&(4)\quad K_1 R_2 \cos(30^\circ x + 45^\circ - C_k) + PR_2\cos(30^\circ x - 45^\circ + C_p)\\
&(5)\quad K_1 R_2 \cos(30^\circ x + 75^\circ - C_k) + PR_2\cos(30^\circ x - 75^\circ + C_p)\\
&(6)\quad K_1 R_2 \cos(30^\circ x + 105^\circ - C_k) + PR_2\cos(30^\circ x - 75^\circ + C_p)
\end{aligned}\right\} (3)$$

Mean. $0.644\, K_1 R_2 \cos(30^\circ x + 30^\circ - C_k) + 0.644\, PR_2 \cos(30^\circ x + C_p)$

$$\left.\begin{array}{ll}(1) & K_2\,R_3\cos(60^\circ x - 90^\circ - C_{2k}) \\ (2) & K_2\,R_3\cos(60^\circ x - 30^\circ - C_{2k}) \\ (3) & K_2\,R_3\cos(60^\circ x + 30^\circ - C_{2k}) \\ (4) & K_2\,R_3\cos(60^\circ x + 90^\circ - C_{2k}) \\ (5) & K_2\,R_3\cos(60^\circ x + 150^\circ - C_{2k}) \\ (6) & K_2\,R_3\cos(60^\circ x + 210^\circ - C_{2k})\end{array}\right\} \quad \ldots\ldots \quad (4)$$

From the formulae (3) we deduce:

$$a - b = p\,\{K_1 \cos C_k - P \cos(C_p + 30^\circ)\}\sin 30^\circ\ t$$
$$- p\,\{K_1 \sin C_k + P \sin(C_p + 30^\circ)\}\cos 30^\circ\ t$$

$$a - c = q\,\{K_1 \cos(30^\circ - C_k) - P \cos C_p\}\sin 30^\circ\ t$$
$$+ q\,\{K_1 \sin(30^\circ - C_k) - P \sin C_p\}\cos 30^\circ\ t$$

in which

$$p = 4 \times 0.966 \times 0.5 \times R_2$$
$$q = 4 \times 0.966 \times 0.866 \times R_2$$

and R_2 denotes the coëfficient of decrease, due to the fact that average values are used for a period of one month.

By equating the corresponding coëfficients of these equations and formulae (2) and putting:

$$Y = K_1 \sin C_k \qquad X = K_1 \cos C_k$$
$$Y' = P \sin C_p \qquad X' = P \cos C_p$$

We find:

$$A/p = -Y - X' \sin 30^\circ - Y' \cos 30^\circ$$
$$B/p = X - X' \cos 30^\circ + Y' \sin 30^\circ$$
$$A_1/q = X \sin 30^\circ - Y \cos 30^\circ - Y'$$
$$B_1/q = X \cos 30^\circ + Y \sin 30^\circ - X'$$

which are satisfied by the values:

$$Y = 12.23 \text{ cM.} \qquad X = -11.14 \text{ cM.}$$
$$Y' = -0.48\ \text{»} \qquad X' = 4.21\ \text{»}$$

$$K_1 = 16.54 \text{ cM.} \qquad P = 4.24 \text{ cM.}$$
$$C_k = 102^\circ\,19'\ \text{»} \qquad C_p = 353^\circ\,30'\ \text{»}$$

In order to obtain a serviceable combination for the calculation of the constants of the tide K_2, the values

$$a + b - 2\,c$$

are formed.

In these values again the annual variations and the aperiodic disturbances are eliminated.

	$(a + b - 2c)$
May	—101.0 cM.
June	—106.4 »
July	—105.4 »
August	— 78.5 »
September	— 7.7 »
October	44.9 »
November	77.6 »
December	57.3 »
January	5.7 »
February	— 37.3 »
March	— 65.9 »
April	— 22.8 »

The double-periodic variation of these values, as computed by the method l. sq., may be represented by the expression:

$$27.575 \cos 60° x - 14.015 \sin 60° x \quad . \quad . \quad . \quad . \quad . \quad (5)$$

From (4) we find:

$$(1) + (2) = a = 2 K_2 R_3 \cos 30° \cos (60° x - 60° - C_{2k})$$

$$(3) + (4) = b = 2 K_2 R_3 \cos 30° \cos (60° x + 60° - C_{2k})$$

$$(5) + (6) = c = 2 K_1 R_3 \cos 30° \cos (60° x + 180° - C_{2k})$$

$$a + b - 2c = 6 K_2 R_3 \cos 30° \cos (60° x - C_{2k}) \quad . \quad . \quad . \quad (6)$$

This equation shows that, by this method, the constants of K_2 can be determined from a periodic formula in which the amplitude is about 5 times larger than the value which has to be calculated.

By equating the coefficients of (5) and (6) we find:

$$K_2 \cos C_{2k} = 5.558 \qquad K_2 \sin C_{2k} = -2.825$$
$$K_2 = 6.24 \text{ cm.} \qquad C_{2k} = 333° 3'$$

e. The average monthly values of the water-level are found by correcting the mean values as obtained by direct computation for the influence of the tides S_1, K_1 and P. From formulae (1) and (4) it appears that (for the actual hours of observation) the correction due to the influence of S_2 and K_2 is nil; that for the single periodical tides is given by the average values of formula (1) and (3) and is to be applied with inversed signs.

Correction for	cm.	S_1	K_1	P	Correct. values cm.
May	101.9	1,70	2,27	—2.72	103.2
June	117.0	1.70	— 3.24	—2.50	113.0
July	124.4	1.70	— 7.88	— 1.62	116.6
August	134.4	1.70	—10.41	—0.31	125.4
September	124.9	1.70	—10.15	1.09	117.5
October	105.8	1,70	— 7.17	2.20	102.5
November	98.1	1.70	— 2.27	2.72	100.3
December	90.3	1.70	3.24	2.50	97.7
January	101.8	1.70	7.88	1.62	113.0
February	102.3	1.70	10.41	0.31	114.7
March	104.9	1.70	10.15	—1.09	115.7
April	109.7	1.70	7.17	—2.20	116.4
Mean	109.6	1.70			111.33

The corrected monthly means exhibit a principal maximum (low water) in August and a principal minimum (high water) in December; owing to the abnormal low value in May the position of the secondary extremes is doubtful.

The *constants* for *Sa* and *Ssa*, computed from these data, therefore do not give more than a rather rough approximation of the actual state of affairs.

The following expression is found:

$$W = 111.33 + 5.54 \cos (30^\circ t - 28^\circ 55') + 9.48 \cos (60^\circ t - 190^\circ 50')$$

in which the origin of time coincides with May 16th.

As might have been expected the accordance between the observed and calculated monthly departures from the annual mean leaves much to be desired:

	Observed. cm.	Calculated. cm.
May	— 8.1	— 4.03
June	1.7	— 0.37
July	5.3	7.71
August	14.1	11.56
September	6.2	5.81
October	— 8,8	— 5.83
November	—11.0	—13.73
December	—13.6	—11.45
January	1.7	— 1.78
February	3.4	6.20
March	4.4	6.02
April	5.1	— 0.11

A systematical investigation of the normal and abnormal motions of the mean water-level, if extended over a large area and over some years, might prove of great importance with respect to two interesting problems.

In the first place it would appear from such an inquiry that it will be always impossible to predict with great accuracy the *absolute* water-level at a given place even when the periodic terms of the tidal components are fully known; therefore it can be of no use to carry on the calculations in behalf of tidal prediction to an astronomical degree of accuracy; in the second place an inquiry into the aperiodic departures from the average normal values might lead to a better knowledge of the important and varying meteorological influences which prevail on the ocean, than by means of the incomplete and scattered observations taken on board ship.

It is not improbable that the variations of the water-level e.g. in the Gulf of Bengal and the Arabian Sea, which must be dependent on the "vis a tergo" in the Indian Ocean in and south of the area of the trade-winds, might give a clue to the prediction of the periods of drought to which the climate of India is subject.

f. In recapitulating the results obtained, it must be kept in mind that the zero-point of the tide-gauge is on the upper end, so that low figures denote high water. If positive numbers are to correspond with high, negative numbers with low water, the argument of the formulae must be augmented or decreased by 180° and the corrected monthly values subtracted from an arbitrary number.

After reduction to the conventional origin of time, application of the augmenting factor $1/R$ to the amplitudes of the annual variations, reduction to average values of the constants in so far as they are dependent on the moon's declination and, finally, inversion of the sign, the following tidal constants are found for *Telok-Betong*:

	Telok Betong.		Java's 4th Point	
	H	$\varkappa$	H	$\varkappa$
S_1	2.7 c.m.	27°	—	—
S_2	13.7	262°	12.8 c.m.	280°
M_2	32.1	222°	24.2	210°
K_1	15.5	269°	6.8	226°
O	7.8	265°	3.4	216°
P	4.2	231°	1.7	171°?
N	5.6	192°	4.1	190°
K_2	5.3	246°	2.5	299°
Sa	5.6	263°	1.4	220°
Ssa	9.5	120°	5.6	149°
W	111.3		53.9	

Besides the constants for *Telok-Betong* these quantities are given also for the tidal station *Java's 4th Point*, situated too in *Sunda-strait*; they have been computed from a five-year series of observations.

A comparison between the data for the two places exhibit some important differences, whilst a look at the chart would show that their situation with respect to the tidal wave, progressing from the Ocean in the strait, is about the same.

For the differences of time, *Telok-Betong* minus *Java's 4th Point*, we find:

S_2	$-18°$	=	-0.6	hours.
M_2	$+12°$	=	0.4	»
K_1	$+43°$	=	2.9	»
O	$+49°$	=	3.5	»

The single diurnal tides in the Lampong-bay therefore lag behind those near *Java's 4th Point* in quite another way than the moon's semi-diurnal tide M_2 and this again in another way than the semi-diurnal solar tide S_2, which is in advance.

An estimation of the tides for the one place based on those of the other by assuming a constant difference of time — as is usually done along a coast — is therefore quite inadmissable here, as the differences of time are by no means constant, but variable according to the moon's phase and declination.

If we look at the hindrance which Sumatra's most southerly neck of land offers to the free propagation of the mono-diurnal tide-wave from the *Java-sea* into the Lampong-bay, we should expect a stronger influence of the K_1 wave near *Java's 4th Point* than on the road of *Telok-Betong*, but, on the contrary, the tide near the latter place may be regarded as twice as "monodiurnal" as the tide in the strait, as in shown by the proportion:

$$\text{Ampl. } \frac{K_1 + O}{M_2 + S_2} = 0{,}51 \text{ near } \textit{Telok Betong},$$

$$= 0.28 \text{ near } \textit{Java's 4th point},$$

This prevailing influence of the *Java-sea* on the tides in the bay does not, however, give an explanation of the peculiar fact, that the S_2 tide in the bay causes high water *earlier* than in the strait proper, whereas the other tides occur *later*.

If we assume that the S_2 wave finds its way into the bay in the same way as the other waves, it ought to have rather a retarding effect, because near *Duizend-eilanden* the kappanumber of S_2 is 11°.

It is, therefore, as yet impossible to offer an explanation of this peculiar behaviour of the S_2 tide and we can only state that spring and neap near *Telok Betong* occur 1,64, and at *Java's* 4[th] *Point* 2,87 days after New and Full Moon and First and Last Quarter.

It must be remarked however, that the constants S_2 near *Java's* 4[th] *Point* are not quite exact owing to the fact that they had to be calculated from observations taken thrice daily, whilst (as appears from formulae (1)), for the complete determination of W, S_1 and S_2 at least five independent — i. e. not 6 or 12 hour distant) data are required.

In calculating the S_2 constants, therefore, it is assumed either that S_1 is small with respect to S_2, or that the kappa-number of S_1 (land- and seabreeze) is about 65° or 245°, in which case, for the hours of 9 a. m., 2 and 6 p. m., the influence of S_1 disappears altogether.

In fact the seabreeze at most places causes high water about 4 or 5 p. m. and, with the exception of only a few places, e. g. *Semarang*, the amplitude of S_1 is insignificant everywhere in the Archipelago.

The neglect of S_1 therefore, cannot in most cases have any appreciable influence on the determination of the S_2-constants and it is principially for this reason that, for the greater part of the tidal stations, the above mentioned hours of observation have been selected.

In this special case, moreover, it is highly improbable that the kappanumbers of S_2 for *Java's* 4[th] *Point* would undergo a decrease if it were possible to correct for the neglect of S_1, because, if we assume for S_1 the same kappanumber as near *Telok Betong*, viz. 27°, the kappanumber of S_2 becomes 285° instead of 280° so that the difference would increase rather than decrease.

The tides of long duration Sa and Ssa may be considered to run pretty well parellel if allowance is made for the fact that the constants have been calculated from observations made during different periods.

II. *Sabang-bay.*

In this bay of the isle of *Weh* or *Waai* situated north of Sumatra's most northerly point in 5°54' N. Lat. and 95°20' E. Long., tidal observations have been made since June 1[st] 1897 at the hours of 7 a.m., 11 a.m. and 4 p.m.

The results calculated from the first year-series may be given here and, for the sake of comparison, also the constants for the road of *Oleh-leh.*

As the hours of observation are not the same as those at which the observations have been made at *Telok-Betong*, new formulae had to be applied; the method however being essentially the same, the results of the computation only may be given here.

	Sabang.		Oleh-leh.	
	H	*κ*	*H*	*κ*
S_2	24.1 cM.	310°	13.3 cM.	329°
M_2	46.6	266°	23.0	285°
K_1	9.1	291°	6.3	318°
O	3.5	274°	2.3	323°
P	2.1	10°	?	?
N	8.3	265°	3.0	286°
K_2	4.9	312°	4.2	333°
Sa	9.2	165°	8.8	65°
Ssa	8.5	114°	6.8	145°
W	202.8		118.5	

The tidal constants for *Oleh-leh* have been computed from three series of observations made during three years from 1895 to 1898; it appears that the tide *P* is so small that it cannot be calculated with any degree of accuracy from the given data, which is proved by the fact that the three determinations for the different series widely differ.

No more importance can be attached to the constants of *P* in *Sabang-bay*, because its argument cannot possibly be 10°, but must be somewhat smaller than 291°, the argument of K_1.

For the rest the conformity of the arguments of S_2 and K_2, M_2 and *N*, and the differences between those of S_2 and M_2, K_1 and *O* are to be considered as so many proves of the reliability of the results.

The influence of the wind cannot be determined, as for neither station a calculation of S_1 can be effectuated from the available data; it cannot be of great importance because otherwise the difference between the arguments of S_2 and M_2, which is $44° = 1.80$ days, i.e. quite normal, would be sensibly affected.

As, for all practical purposes, both tides may be considered as almost exclusively semi-diurnal, it is possible to assume a constant difference of time; this difference *Oleh-leh* minus *Sabang* is:

S_2	$19° = 0.6$	hours,
M_2	$19° = 0.7$	»
N	$21° = 0.7$	»
K_2	$21° = 0,7$	»

so that the difference amounts to 42 minutes of time, whilst the amplitude may be assumed to be twice as large at *Sabang* — at least in the back parts of the bay — as on the road of *Oleh-leh.*

The mono- and semi-annual variations are for both places somewhat different; from the three series of observations at *Oleh-leh* it appears however that in these regions the monthly mean values of the sea-level widely differ for different years, so that a better agreement might be expected only if the observations extend over a long series or at least over simultaneous periods.

It is of some importance to remark that, whereas the semidiurnal tides at *Sabang* are nearly twice as strong as near *Oleh-leh*, the mono-diurnal tides seem to be amplified in a far less degree.

This point, concerning the way in which both tides propagate and are enlarged or diminished, is of great importance for the understanding of the mechanism of tides and requires a thorough investigation.

With a view of elucidating this point tide-gauges ought to be established at the entrance and in the back parts of bays and estuaries: for these experiments however stations should be chosen where the mono-diurnal tides are better marked than at *Sabang* so that an accurate determination of the characteristic constants is possible.

An analysis of tides at different parts of a river in which a tidal wave of mixed description propagates would also afford useful data for this purpose.

Hydrography. — "*On the relation between the mean sea-level and the height of half-tide.*" By H. E. De Bruyn.

The mean sea-level is the mean of the height of the water observed at short intervals i. e. every hour.

Observations have proved, that the mean of 3-hourly observations does not practically deviate from this; in this way the mean sea-level in the years 1884—1888 has been determined by the Royal Geodetical Commission (Annual report of the Commission 1889).

Generally it is admitted that there is a constant difference, between