

## MEASUREMENT OF CURRENTS IN THE GULF OF BOTHNIA

(Extract from an article entitled *Zur Bestimmung des Trijstromes aus Terminbeobachtung*, by E. PALMEN, of the *Institut für Meeresforschung*, Helsingfors, published in the *Journal du Conseil Permanent International pour l'Exploration de la Mer*, Vol. VI, N° 3, p. 387).

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By calculating the vector means of the current for different winds a first relation is obtained between wind and current, at the surface and at 20 metres depth, at the Swedish lightship *Finngrundet* in the Bothnian Sea. All current measurements made during the years 1923-1927 are made use of. The current corresponding to a given wind, thus calculated, is the resultant of the pure drift current, the "slope current" (gradient current) caused by the influence of the wind on the inclination of the surface of a limited sea (in this case the Bothnian Sea) and the "characteristic residual current" brought on by the horizontal circulation in the Bothnian Sea. By elimination of the slope current and the residual current the pure drift current is calculated. This shows at the surface a mean deviation of about  $43^{\circ}$  -  $45^{\circ}$  to the right from the direction of the wind; the deviation is greater for weak winds ( $40^{\circ}$  -  $53^{\circ}$ ) than for strong ones ( $24^{\circ}$  -  $47^{\circ}$ ). The velocity of the surface current is directly proportional to the velocity of the wind. The ratio has the mean value of  $1.44 \times 10^{-2}$ , which agrees well with earlier determinations. From the surface to 20 metres depth the deviation from wind direction increases by  $19^{\circ}$ . However, in calculating the current at 20 metres depth the influence of the slope current was not taken into consideration.

The results are, on the whole, in good agreement with the theory of V. W. EKMAN, but the great velocity of the current at 20 metres depth, about 3 metres from the bottom, is not in accordance with the assumption of the original theory, that the coefficient of eddy viscosity is independent of distance from the surface.

It was shown that conditions at the other lightships in the North Baltic Seas are less suitable for an investigation of the drift currents.

