

## REGIONS OF MAGNETIC PERTURBATION.

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The "*Nachrichten für Seefahrer*" of 14th December, 1929, give, on page 1640, an interesting note on *Regions of Magnetic Perturbation*, by Dr MAURER. This note in connection with the Baltic Sea, is of interest also to other areas subject to local magnetic perturbations. It reads as follows :-

The recently published "General Chart of the Baltic Sea with the Lines of Equal Magnetic Declination for 1930" (German Admiralty chart D. 98, in 2 sheets), shows these lines on the chart itself and, in an inset, the lines concerning *Bornholm*. For the perturbed areas shown, the following remark has been inscribed on the chart: "In regions of perturbation, the real value of the magnetic variation may differ from the value marked on the chart by more than 2°". It seems advisable to add a few elucidating words with regard to this remark which may, besides, be applied to other charts which include regions with perturbations.

The expression "*magnetic perturbation*" is liable to be interpreted in different ways; in the sense, first, that both terrestrial magnetic perturbations and magnetic perturbations due to the ship may be concerned. But the *terrestrial magnetic perturbation* itself, with which we have to deal exclusively here, may in itself have a double significance, and apply either to a *temporary irregularity*, or to a *local irregularity*.

A *temporary perturbation* occurs when the *momentary* value of the terrestrial magnetic element, for instance the magnetic variation, departs abnormally from the mean value deduced for the same spot from a great number of years. This kind of temporary magnetic perturbation occurs during the so-called "magnetic storms"; these are occurrences which affect the whole of the earth simultaneously, and which causes the terrestrial magnetic element to vary rapidly within a short interval of time. On such occasion, the departures of the magnetic variation are as a rule greater in polar regions than in regions near the equator. But it would be inapposite to attempt to define special regions as being particularly subject to this type of perturbation. The assumption sometimes maintained that, in regions where the run of the lines of equal magnetic declination is irregular, the temporary departures will be particularly great and frequent has proved to be absolutely groundless. Besides, these temporary departures generally oscillate in the opposite direction within a few hours, and rarely exceed 3° in absolute value. Consequently, they can hardly be a factor of danger to navigation on the usual routes.

The notation "*Region of magnetic perturbation*" does not therefore mean "*probability of temporary perturbations*", but always "*regions with local perturbations*".

A region is *with local perturbations* when the run of the magnetic lines therein is so irregular that it cannot be indicated on the chart thereof in an appropriate manner, or when a slight displacement of the ship's position will give an appreciably different reading of the value of the magnetic element. In such regions, it is naturally not an easy matter, as a rule, to acquire accurate knowledge of the true distribution of the lines of terrestrial magnetism. It is for this reason that, in such cases, a general warning only can be given to indicate that, in the region of perturbation, great departures have been observed from the magnetic variations which will be deduced from the chart, or, at least, that there are reasons to expect them.

It would be extremely useful if mariners would carry out precise observations for magnetic variation in the regions where perturbations are reported, and would forward the results to the competent authorities. However, in order to judge of the value of these reports, the fact will have to be taken into consideration that a *difference* observed *with the compass* rarely proves to be a perturbation of the magnetism of the ship, it may well be that a difference in a bearing due to an incorrect position of the ship, imputable to a current, drift or some other cause, has been erroneously taken for a compass deviation. The Deutsche Seewarte and the Marineleitung, as well as their agencies, will appreciate any co-operation in this domain, which tends to demonstrate and to determine the true deviations of the compass caused by terrestrial magnetic influences. This work would not only give increased security to navigation, but would also eliminate certain ill-founded presumptions of terrestrial magnetic perturbations, in places where there are in fact none, or where even if they do exist their influence is immaterial to navigation.

