

# REMARKS ON THE ARTICLE OF Dr G. WÜST

by

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The article of Dr. G. Wüst, relating to the divisions of the oceans of the world, treats of a question which the combined efforts of the mariners and oceanographers have been unable to solve during the many years it has occupied their attention.

This has been occasioned in part by the difficulty in obtaining and applying an international agreement and also, as Dr. Wüst aptly remarks in his first chapter, by the fact that in order to achieve this division one may take different points of view from which one then perceives these "natural regions" very often quite differently. It is certain that for the navigator, the considerations of wind, temperature, currents and the phenomena which occur on the surface of the ocean are much more striking and hold more interest for him than the forms of the bottom; which, on the other hand, become of primary importance to the oceanographer and the geologist. We must, however, recognise the fact that only in the forms of the bottom can we find an absolute unchangeable basis which does not vary with the seasons nor with the years. It should be added further, that if the forms of the submarine relief are not visible to the navigator on the surface of the ocean, they have at least become more accessible to him since the employment of acoustic sounding and an apparatus which records the profile of the bottom on the course followed, providing him with ready knowledge and even the sight almost of these forms.

a) The International Hydrographic Bureau has been led several times to take up questions having some bearing on this matter. The First International Hydrographic Conference, in 1919, considered it "desirable that the limits of enclosed seas should be laid down, and that it might be stated to what sea or ocean a strait connecting two of them should be reckoned." The Hydrographic Offices, and the mariners who use their documents, have need for their Sailing Directions, Notices to Mariners, Light Lists, etc., of uniform conventions fixing precise and simple limits in order that they may know immediately to which chapter and heading to turn to find the information sought. A strait, or a small island should be assigned entirely to one sea and its descriptions may not be divided between two different chapters. Finally it is only a question of deciding to which chapter will be assigned the description of such and such a coast or sea. The trace of the limits should, for the rest, be extremely simple on the charts on the Mercator projection which the mariner employs. After an exchange of view-points among the various Hydrographic Offices, an attempt was made to realize these desiderata by International Hydrographic Bureau Special Publication No 23 of August 1928. In this, consideration was given the most common usage prevalent amongst navigators without pretending to achieve either a geographic or oceanographic work. It should not be surprising therefore, that in this there is to be found no basis for a systematic geographical nomenclature.

b) The VIIth and VIIIth Geographical Congresses in 1899 and 1904, were engaged with the question of a nomenclature for the submarine relief. The International Hydrographic Bureau partially re-opened this question in 1924 in order to achieve some standardization of the precise definitions of the primary forms of submarine relief and some indication of the terms employed by the principal nations in designating them. The results of the investigations conducted by the Bureau are to be found summarized in the article of Rear-Admiral A. P. NIBLACK, President of the Directing Committee, which appeared in *Hydrographic Review*, Vol. V, No 2 of November 1928. The tabulation which appears at the end of the article gives the terms employed by 16 different nations.

There appears to have been fairly general agreement in the employment of this terminology for the submarine relief. Perhaps it may become necessary to supplement or modify these in part when we have greater knowledge of the complexity of the bottom

forms. One might usefully add to them the definitions and the terms corresponding to them in the different languages, of the surface forms of the oceans such as seas, gulfs, straits, passes, etc. We invite attention also to the fact that Dr. Wüster seems to make an important distinction between the German expressions "Meer" and "See", for which, in French as in English, there is only one word for rendering the translation.

c) It appears that all the oceanographers are in accord in continuing the practice of designating by the names of oceanographers, captains or ships, the particularly elevated or deep points which these may have discovered in the bottom of the ocean. In this case it is mainly a question of secondary forms or those of restricted areas which are generally characterized by a figure of maximum or minimum depth.

For the more extensive forms, and in particular for the primary forms, many oceanographers have followed the directives of the VIIth International Geographical Congress and employ a terminology based essentially on geographical considerations. In fact it is rare that a rather extensive arrangement of relief could have been recognised as a whole and in its general form, by a single operator (explorer) or ship, and those particular soundings, or even the profile which they were able to determine, could not have revealed to them the importance nor the extent of this principal form.

But the submarine relief is still very imperfectly known and it seems to us premature to label it with numerous geographical names. The systematic division into basins, separated by ridges or rises, appears to us to be a rather too simplified viewpoint. The difficulty of obtaining soundings at great depths, before the invention of acoustic sounding, was the reason we possess relatively few soundings at depths greater than 5000 metres. The basins of circular or elliptical shape are rather rare. Rather we see long, deep valleys of depths greater than 5000 metres, whose shape becomes very complicated as soon as another profile intercepts them; valleys penetrated by spurs, valleys in which arise gibbosities more or less marked, valleys deepened here and there by narrow trenches (cuvettes). The north Pacific Ocean appears to be a vast plain, analogous to that of Siberia, broken up by trenches (cuvettes), summits and even chains of mountains, but hardly to be defined as a basin. In order to make apparent the rises and ridges it is necessary to resort to lines of depth contour which are different in each case. To consider the Atlantic even — the least imperfectly known of the oceans — the great Atlantic ridge is distinct and continuous above the line of the 4000 metre level; it discloses some gashes and large interruptions above the line of 3000 metres. The same is true of the Walfish ridge. In order to characterize the rises of Guinea, of Liberia and Sierra-Leone, it is necessary to take into consideration the line of 5000 m. Many of the rises proposed show depths greater than 5000 metres. On the other hand, the basins of western Europe, of Newfoundland and Labrador do not attain this depth.

This division into basins appears to approach that of the river basins which was formerly much in vogue for the geographical description of the emergent soil and which has now been almost entirely abandoned — although it did correspond to a very real separation in the flow of the waters — because it led to the attribution of excessive importance to some insignificant reliefs which were at times invisible to the eye. The authors of this division of the ocean into basins separated by rises (in particular Alexandre SUPAN) have not failed to recognize the fact that many of the rises are hypothetical and represent very slight differences in altitude between the basins which they separate. Under these conditions, is it really necessary to give names to these alterations in the ground forms which are hypothetical or scarcely apparent? Is it not to be feared that these divisions might not correspond to reality, and that we shall be doing nothing more than guessing at regions very imperfectly known and in which are vast expanses of which we are completely ignorant?

It appears to us entirely premature to attempt to obtain an international agreement for a nomenclature which rests upon such fragile bases, and we believe it advisable to restrict ourselves, for the primary forms, to a very small number of names, either by provisionally retaining some of the names given from the beginning and which are doubtless destined to disappear, or else by giving geographical names to some of the rare forms which appear in a really clear manner and already with satisfactory accuracy.

d) Can the morphological base be adopted for delimiting the secondary or marginal seas, by taking as a boundary the projection onto the surface of the morphological character of the ocean bottom? This would seem to be possible at times, especially if the boundary happens to be the line of a crest; a line which requires no arbitrary convention and which is independent of the choice of the unit of measurement adopted.

Meanwhile, if one desires to establish a nomenclature which shall not be employed solely by oceanographers, it is impossible to leave out of all consideration the acquired habits, based in general upon quite other considerations, but which are of primary importance to their users. Although the marginal seas generally extend beyond the limits of the territorial waters, the greatest consideration should be given to the names given them by the bordering countries, for which it is highly desirable that the usage be adopted internationally as is done for geographical names in the various countries.

The necessity for dividing the oceans at large into seas, where they lie beyond the barrier of the islands, is not evident to us. There, where no division, even more or less defined, has entered into the customary usage of geographers or mariners, it does not seem that it would be advisable to create one. The diverse physical sciences of the ocean — biological, geological, dynamic, bathymetric — will be able to define certain domains in accordance with their own inclinations generally different for each science, without the geographer or the mariner having to bother about a division which partakes too much of a special character and whose limits are too vague and complicated.

e) For the rest, the Directing Committee would be very glad to have some competent persons submit their opinions on these questions, which they will make known to their readers through the intermediary of the "Hydrographic Review".

