

with the enormous quantities swept there by the surf waves.

Let the bather beware, the "undertow," however incorrectly named, is real and a serious menace to the most powerful swimmer. Beware the treacherously warm water and stay away from the outer bar at high tide with onshore wind and strong surf.

M. P. HITE

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AMONG a number of letters received from observant surf bathers on the Atlantic and Pacific coasts, most of whom agree that there is no such thing as a persistent undertow, is one from Miss L. R. Craig, Agawam, Massachusetts, who gives a graphic account of a true undertow experienced when swimming opposite the middle of a concave or pocket beach between rocky points at Hampton, New Hampshire, in July, 1923; although she is an expert swimmer, a current was felt like that of a river, except that it was below the surface so that it dragged her under water; she was pulled down as if by suction in water over her depth. She escaped by swimming obliquely to the shore, as it was impossible to make headway against this undertow. The note is added that "strong men have been drowned at Hampton Beach by undertow." This would therefore seem to be an example of the kind that I mentioned in my article on "The Undertow Myth," except that no mention is made of an on-shore wind as its cause; but the day was "cold and dreary," thus implying a wind from the ocean.

It is because of the occasional occurrence of such verified undertows that I regret the use of that ominous term by Mr. Hite in his letter above, as applied to surface streams. It appears to me also that he gives too great importance to the transformation of oscillatory into translatory waves as the surf rolls on shore, and also to the off-shore bar, as causes of the local, outflowing streams. An on-shore wind would tend to brush the surface water shoreward without a bar on the bottom and without that transformation at the surface; and compensating outflows might then be produced at various points along a straight beach. But the term, undertow, should not be applied to them.

Mr. Brant misunderstands me if he thinks I am not "willing to concede" the existence of any current, surface or elsewhere; such currents are well attested by observation; for example, the general seaward surface drift that he describes as occurring for a time in a bay on the California coast; but such a current appears to be quite different from a possible "undertow," either there or elsewhere. Furthermore, I see no sufficient ground in Mr. Brant's observations for

his "flat challenge" of my suggestion that a real undertow may be caused in a bay by an onshore wind: the surface current that he observed in a bay during an offshore wind seems to me aside from the case. In the interest of clear discussion, I think it is undesirable to use the word "current," in describing the oscillatory movement of the water in swell and surf: the essence of a "current" is a persistent movement in one direction over a considerable area for a considerable time. True, the term is used in naming the flood and the ebb of the tides, which are, in relation to great oceanic spaces, local and temporary; but as they run over areas of scores or hundreds of miles and for periods of several hours, they seem to be currents. For waves, terms like crest advance and trough recession seem more appropriate, as more likely to convey the true and intended meaning.

The difficulty in the undertow problem lies in the fragmentary nature of the facts: and so in the curious offshore and onshore drift that Mr. Brant describes, his account is naturally enough, as it depended on a swim in the bay, incomplete. It might be possible to explain the phenomena if they were more fully recorded.

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PAUL TO THE THESSALONIANS

PROFESSOR C. W. E. MILLER, of the Greek department of the Johns Hopkins University, has kindly pointed out to me that in *SCIENCE* of April 17, 1925, page 419, the well-known admonition of Paul to the Thessalonians, in being requoted, suffered "startling maltreatment of the Greek words." Professor Miller gives me the following as the exact wording and accentuation of the verse:

πάντα δοκιμάζετε,
τὸ καλὸν κατέχετε.

If you will kindly publish this correction I shall be obliged.

CHARLES D. SNYDER

ERROR IN HERALDRY

THE "fable" in the issue of *SCIENCE* for May 29 involves a serious error in heraldry. There is no such charge as a "bar sinister." A bar is a band horizontally across the shield and can, therefore, be neither dexter nor sinister. The indication of bastardy is the "baton sinister," a narrow band not reaching to either side of the shield but lying obliquely from the sinister area to the dexter.

HENRY LEFFMAN