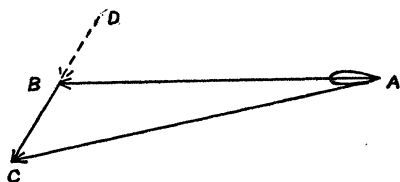


and velocity of the wind on the ship or at the kite, as well as the speed of the ship, the triangle of forces gave the true velocity of the wind and its direction relative to the course of



the vessel. For example, let AB be the wind due to the motion of the steamer in the opposite direction and let AC be the wind observed on board, the direction relative to the vessel being indicated by the drift of the smoke and its velocity measured by an anemometer. Then the third side, BC , of the triangle represents the direction of the natural wind and its velocity on the same scale. The problem is not new, for in Abbe's 'Treatise on Meteorological Apparatus and Methods' (*Report of the Chief Signal Officer for 1887, Part 2*), several graphical and mathematical solutions that have been proposed since 1847 are cited, and in the November *Pilot Chart* of the United States Hydrographic Office, a table shows the true direction of the wind with regard to the ship and its force, when there are known, the speed of the ship, the angle that the apparent wind makes with it (points off the bow) and the force of this wind.

It does not seem to be understood, however, that the same result may be reached without any measurement whatever of wind velocity or estimation of force by merely measuring, in addition, the angle that the true wind makes with the ship, which is easily done by watching from the weather side the wave-crests as they approach the vessel. If, in the figure, AB again represent in direction and speed the ship's wind, and AC , in direction only, the resultant wind, then by measuring the angle DBA that the true wind makes with the ship we have, as before, the third side, BC , of the triangle. The method fails when the wind is in line with the ship's course and becomes inaccurate when the angle between them is small. In other cases, since the speed

and course of the ship are always sufficiently known and the two angles BAC and DBA can be measured with precision, the method is better than the first because of the difficulty in measuring the resultant velocity, arising from the upward deflection of the wind on striking the ship. When steaming through calm air, experiments with Dines' portable pressure anemometer demonstrated that in few localities on board was the speed of the vessel indicated by the horizontal movement of the air, one such place being just aft of the bow. Elsewhere a less speed was usually recorded, though under the bridge the compressed vein of air flowed astern faster than the boat moved ahead. In view of this difficulty of measuring the apparent wind velocity on a moving vessel, any method of ascertaining the true velocity with considerable accuracy, without employing an anemometer, is desirable from a scientific as well as from a practical standpoint, and, therefore, the simple method last described, which may usually replace the other, is now published for the first time, so far as the writer is aware.

A. LAWRENCE ROTCH.

BLUE HILL METEOROLOGICAL

OBSERVATORY, December 10, 1901.

THE ANDREW CARNEGIE RESEARCH SCHOLARSHIP.

A RESEARCH scholarship or scholarships, of such value as many appear expedient to the Council of the Iron and Steel Institute, from time to time founded by Mr. Andrew Carnegie (Vice-President), who has presented to the Iron and Steel Institute sixty-four one-thousand dollar Pittsburg, Bessemer and Lake Erie Railroad Company 5 per cent. Debenture bonds for the purpose, will be awarded annually, irrespective of sex or nationality, on the recommendation of the council of the institute. Candidates, who must be under thirty-five years of age, must apply, on a special form before the end of March to the secretary of the institute.

The object of this scheme of scholarships is not to facilitate ordinary collegiate studies, but to enable students, who have passed through college curriculum or have been trained in industrial establishments, to con-

duct researches in the metallurgy of iron and steel and allied subjects, with the view of aiding its advance or its application to industry. There is no restriction as to the place of research which may be selected, whether university, technical school, or works, provided it be properly equipped for the prosecution of metallurgical investigations.

The appointment to a scholarship shall be for one year, but the council may at their discretion renew the scholarship for a further period instead of proceeding to a new election. The results of the research shall be communicated to the Iron and Steel Institute in the form of a paper to be submitted to the annual general meeting of members, and if the council consider the paper to be of sufficient merit, the Andrew Carnegie Gold Medal shall be awarded to its author. Should the paper in any year not be of sufficient merit, the medal will not be awarded in that year.

By Order of the Council,

BENNETT H. BROUGH,
28, VICTORIA STREET, LONDON. *Secretary.*

CURRENT NOTES ON PHYSIOGRAPHY.

THE WASHINGTON FOLIO.

THE Washington double-sheet folio, by Darton and Keith, embraces a district in which the Potomac flows from its gorge in the Piedmont plateau to its estuary in the Coastal plain. Along the junction of the two areas is an 'inner lowland' similar to that so well developed in New Jersey, but of less breadth. It is determined on one side by the descending floor of crystallines on which the Coastal plain strata rest, and on the other by a pale and ragged 'cuesta' whose sinuous crest appears to be held up by the Matawan formation, overlapped by abundant later deposits, while the lowland itself is opened out on the clays and sands of the Potomac (Cretaceous) formation. The economic sheets give the underground contours of water-bearing strata. The structural sections exhibit the wonderfully even truncation of the steep-dipping crystallines in the Piedmont area. A novel feature is presented on the physiographic geology sheet, where the existing planes and slopes are colored according to the date of their production, and

not that of the rocks on which they are carved. This brings out clearly the pre-Columbia dissection of the Lafayette plain, as well as the Columbia and later terraces, the latter having their greatest extension along the inner lowland between the old land and the cuesta.

PHYSIOGRAPHIC ECOLOGY.

'THE Physiographic Ecology of Chicago and Vicinity, a study of the origin, development and classification of plant societies,' by Cowles (*Botan. Gazette*, XXXI., 1901, 73-108, 145-182), and 'The Genetic Development of the Forest of Northern Michigan, a study in physiographic ecology,' by Whitford (*ibid.*, 289-325), are essays in which the relation of plant distribution to land forms is carried to much more than ordinary detail. Not only is the existing distribution of plants traced out, but the extension of one plant society and the corresponding restriction of another, with the slow advance of physiographic development, as previously suggested by Woodworth, are here clearly pointed out, as in the discussion of the flora of ravines, valley sides and flood plains.

Studies of this kind are of especial interest to the physiographer from the use that they make of physiographic details; they are encouraging in the evidence that they give that the real intention of physiography is coming to be recognized. It is not so much an end in itself as a means to a larger end; hence it must concern itself not only with large features of earth form and climate, but with local details as well. It is particularly in these applications of physiography that an effective terminology will be demanded, for when the distribution of plant societies is followed out on so gently modulated a surface as that of a flood plain, nothing less than a systematic and detailed method of description will suffice. When not only biologists, but geographers and even travelers come to avail themselves of the results of physiographic study, the need of a careful terminology will be still more apparent.

THE COAST-PLAIN OF NORWAY.

UNDER the title 'Søndre Helgelands morfologi' (*Norges geol. undersøgelse*, No. 29,