comes increasingly more brittle and is very easily injured. The sign of the charge at the surface may also be reversed, and such reversal appears to be accompanied by a visible swelling of the surface layer. At the same time the interior protoplasm becomes coagulated.

There is a decided variation in the behavior of sea-urchin eggs from day to day. This was at first very puzzling, for under apparently identical conditions the phenomena associated with reversal of surface charge sometimes occurred and sometimes failed to occur. Undoubtedly the charge at the surface of the cell is greater under certain conditions than under others. When sea-urchin egg cells are taken directly from the ovary, the charge at the surface appears to be greater than when the cells are washed in sea water. The difference is marked and it is believed to be due to a greater concentration of HCO_3 or CO_3 ions at the surface of the unwashed eggs. Washing the eggs lowers the concentration of carbonic acid in the sea water surrounding them. This disturbs the carbonate equilibrium and results in a loss of HCO_3 or CO_3 ions from the cell surface. The result is a decrease in the surface negative charge.

Indeed, it seems certain that one source of the charge at the surface of living cells is the diffusion of carbonic acid. Many years ago Ostwald[2] showed that when a semipermeable membrane hinders the passage of certain ions as compared to others, the membrane becomes the seat of an electric charge. There are reasons for assuming that the HCO_3 and CO_3 ions diffuse more readily through the surface membranes of cells than the H ion. If this is true then the exterior of living cells would of necessity always be negative, and this negative charge would be greater the greater the amount of carbonic acid being given off.

On the basis of this view, since we know that during activity of the cell there is a large increase in carbon dioxide production, it is easy to understand why the surface of active protoplasm should be electrically negative as compared with the surface of relatively inactive protoplasm. We are therefore led to a very simple explanation of the action current.

It is hoped to further develop these views and their applications in a more extended paper now in course of preparation.

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DIFFERENTIAL TILTING OF THE CONTINENTAL SHELF OFF THE ATLANTIC COAST OF NORTH AMERICA

RECENT studies of submarine profiles off the Atlantic coast from Florida to Nantucket reveal interesting facts regarding the depth of the outer margin of the continental shelf from Florida northward. Hydrographic charts of this area show that the continental shelf, or submerged portion of the coastal plain, which off southern Florida is only a few miles wide, broadens off the Carolinas and Virginia to 50 to 80 miles, reaches a breadth of 100 miles off northern New Jersey and 150 miles or more off the coast of Maine. The emerged portion of the coastal plain, on the contrary, is broad at the south and narrows toward the northeast until it disappears in the vicinity of Long Island. These facts clearly suggest a progressively greater submergence of the Atlantic coast toward the northeast, emergence toward the southwest, or both.

Projected profiles showing the average form of the sea floor for belts 10 to 15 miles broad were made at frequent intervals along the coast across the continuous shelf adjacent to the continent, not including the Bahama Banks or the second shelf known to occur at great depths farther to the eastward. In a number of cases the margin of the shelf appears rounded or irregular, and the precise position of the edge of the shelf is somewhat difficult to determine. A basis for comparison of the relative positions of the shelf edge was obtained by projecting seaward the normal surface slope of the continental shelf, as shown on the profiles some distance back from the rounded or ragged margin, until it intersects a similar upward projection of the scarp face. These intersections, although not indicating the precise position of the edge of the shelf, may be assumed to vary in elevation about as the edge of the shelf varies. On studying the position of these intersections in various profiles, it was found that they show a progressive increase in depth from Florida northward, as given in the accompanying table. The depths from Nantucket northeastward were obtained from profiles drawn by M. A. Stolfus.

Approximate Relative Depths below Sealevel of Edge of Continental Shelf from the Banks to Florida

Origin and direction of profiled belt	Depth of intersection of shelf surface and scarp in fathoms
From Grand Manan Channel, s.	68
" Cutler, Me., s.	64
" Great Wass Island, Me., s.	60–62
" Dyers Bay, Me., s.	64
" Mt. Desert Island, s.	68
" Isle-au-Haut, Me., s.	66
" Vinalhaven Island, Me., s.	71
" Tenant Harbor, Me., s.	70
" Portland, Me., s.	68
" Nantucket Island, s.s.e.	54
" Martha's Vineyard, s.	54
" Sagg and Wainscott, L. I., s.s.e.	47
" Shinnecock Bay, L. I., s.s.e.	50

[2] Ostwald, 1890, *Zeitschr. f. physik. Chem.*, VI, 71.

Approximate Relative Depths below Sealevel of Edge of Continental Shelf from the Banks of Florida (Cont.)

Origin and direction of profiled belt	Depth of intersection of shelf surface and scarp in fathoms
From Beach Haven, N. J., s.e.	52
" Intersection of 39° N.–73° 30′ W. e.s.e.	48
" Atlantic City, s.e.	53
" Wildwood, Cape May, N. J., s.e.	50
" Chincoteague Bay, Md., e.s.e.	42
" Fishing Pt., Md., e.s.e.	44
" Cedar Id., Md., e.s.e.	48
" Cobb's Id., Md., e.s.e.	40
" False Cape, e.n.e.	25
" Line of soundings e. from Currituck Sd. Light	20
" Roanoke Id., n.e.	25
" Long Shoal Pt., Pamlico Sd., e.	30
" Cape Hatteras, s.e.	18
" Portsmouth Id., s.s.e.	30
" Cape Lookout, s.s.e.	30
" Stump Sound, s.e.	30–36
" Cape Fear, s.s.e.	30
" Little River, s.s.e.	30
" Cape Romain, s.e.	24
" Charleston, S. C., s.e.	25
" St. Helena Id. (Beaufort) s.e.	28
" Savannah, s.e.	30
" St. Simon Sound, e.s.e.	27
" Pablo Beach, Fla., e.	24
" Halifax R. (Daytona) n.e.	25
" False Cape, Fla., n.e.	27
" Sebastian, Fla., n.e.	21
" Stuart, n.e.	15
" Card Sound, s.e.	3½
" Up Matecumbe Key, s.s.e.	4
" Vaca and Fat Deer Keys, s.s.e.	3

It will appear from this table that the margin of the Atlantic continental shelf, which, in the region of southern Florida, is only a few fathoms below sea level, is from 25 to 35 fathoms deep off Georgia and the Carolinas, 40 to 48 fathoms opposite Maryland, 48 to 55 off the New Jersey and Long Island coasts, and 60 to 70 fathoms deep at the outer edge of the Banks. This increase in depth confirms in a striking manner the differential tilting of the continent suggested by the broadening of the continental shelf and the narrowing of the coastal plain. It also confirms the conclusions reached by Johnson and Stolfus in a paper on "The submerged coastal plain and oldland of New England," appearing in SCIENCE for March 28, 1924. In this article submergence progressively greater toward the north was proved by the presence of the cuesta and inner lowland wholly submerged beneath the waters of the Gulf of Maine, whereas these forms are found above sea level farther south.

These observations indicate that the margin of the shelf certainly pays scant attention to the 100-fathom depth at which it is traditionally supposed to occur, and give no support to the theory that wave base is found at the same depth.

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

GEOGRAPHICAL SOCIETIES AT THE WASHINGTON MEETING

(A report for Section E appeared in Science for February 6.)

The Association of American Geographers

President, Curtis F. Marbut.
Secretary, Chas. C. Colby.

(Report by the Secretary)

The twenty-first annual meeting of the Association of American Geographers reached the high-water mark both in the number of papers presented and in attendance. Forty-five papers were presented and five were read by title. Nearly 40 per cent. of the membership of one hundred and thirty-five and others to the number of approximately one hundred were in attendance at the sessions, which spread over three days and included six regular sessions, an evening round table, and a joint dinner with Section E of the A. A. A. S. The meeting was characterized by the general excellence of the papers, by active and discerning discussion and by the fact that the program proceeded according to schedule throughout. As a cross-section of productive scholarship in geography in America, the meeting indicates that important progress is being made in several aspects of the subject, and particularly as to the critical issues in economic and regional geography. Interest at the meeting centered in the special sessions devoted to tropical geography. Thirteen papers dealing with tropical problems were presented at the Wednesday morning and afternoon sessions and they constituted the basis for a round-table discussion in the evening. The papers covered problems of widely divergent character and were particularly virile because at least nine of them resulted from recent field work in the tropics. That economic development in many tropical areas is handicapped by the rainfall régime was pointed out by S. S. Visher, of the University of Indiana, and "An example of local variation of tropical climate" was discussed by J. Russell Smith, of Columbia University. Regional studies in Honduras and in western Ecuador were presented, respectively, by Nels