servations on certain asters at stations near Lake Erie, Boston, the White Mountains, New York City, etc., at each of which he has kept certain varying species under scrutiny for some years, to determine their range of variation in nature under unchanged environment.

Professor Underwood reported herbarium work at Kew, the British Museum, and Paris, with particular reference to the herbarium of Cosson which is very rich in ferns, especially of South America and the West Indies. An interesting week was given to a trip to Biarritz, Spain, and the Landes, with views of the turpentine industry now flourishing among pine forests of the Landes originally planted as a protection from the sand-dunes. These pines average about ten inches in diameter. Maize was seen cultivated in the Basque provinces and to Bordeaux, the tops being cut off to favor the ripening of the ears, as in our South.

Edward S. Burgess,
Secretary.

NOTES ON OCEANOGRAPHY.

The deepest fiord on the Labrador coast.

An expedition on the schooner *Brave* spent the past summer exploring the northeastern coast of Labrador. Twenty-one soundings in Nachvak Bay sufficed to show that it is a typical fiord. The line of dangerous reefs two miles to seaward from the mouth of the bay belongs to a rock-sill which bars off the inlet from the deeper water of the Atlantic. Already at the mouth the depth is 107 fathoms. Six miles to westward, in the axis of the bay, the depth is 110 fathoms; for the next six miles it averages 100 fathoms. Then the bottom rapidly shoals to a narrow bar covered by no more than 18 fathoms. On account of its continuity with a projecting spur of bed rock on each side, it was concluded that the bar is composed of the same material. From the summit of this submerged ridge a second steep slope leads to a depth of 80 fathoms which persists to a point opposite the Hudson Bay Company's Post. Twenty miles from the mouth, a second bar of similar composition gave only 15 fathoms; it is flanked by depths of 60 fathoms. The bay has two branches, each heading about 25 miles from the bay-mouth, and is from one to two miles wide. Precipitous cliffs from 2,000 to 3,400 feet high appear in the profile of the U-shaped cross-section which is the rule in all parts of the bay. The deepest sounding recorded on the Admiralty charts for the bays of this coast is 100 fathoms in Hamilton Inlet.

The temperatures on August 30th were: at 110 fathoms, —1°.7 C. (29° F.); at 50 fathoms, —1°.4 C. (29°.4 F.); at 20 fathoms —1°.2 C. (29°.9 F.); at the surface, + 6°.8 C. (44°.3 F.). The temperature of the water from 20 fathoms downward to 50 fathoms is colder than the water at corresponding depths in the open Atlantic outside. The bottom temperature is very close to that characteristic of the envelope of brackish water formed about a piece of sea-ice melting in normal open-Atlantic water. Drift-ice finally left Nachvak Bay this year as late as the first week in July.

Drift-ice and the theory of ocean currents.

The extraordinary smoothness of the sea covered by drift ice, even when the pans are widely spaced, is truly astonishing to one making his first voyage in such waters. His sailing ship may be favored with a fresh breeze and yet the ocean surface be quite level, save for the minute rippling characteristic of a small pond ruffled by a summer breeze; ground-swell does not exist. It is a matter of common knowledge among the fishermen of the Atlantic Labrador coast that the Labrador current, or 'tide,' as they invariably express it, often shows high velocity, although its surface, for a length of a thousand miles and a breadth of from one hundred to three hundred miles, is covered with loose pan-ice. At such times, the wind is, or has just been, strong and from a northerly quarter. We are justified in believing that the pans act as the sails which, in ice-free waters are represented by wind-waves. Floes and pans project above the surface from one to twenty feet or more. They may be expected to exert a coercive force on the film of relatively fresh water derived from the melting of the ice in contact with the heavier salt water beneath. According with the behavior of such 'dead water,' as described by Nansen and others, the light surface layer will tend to

move *en masse* and in the direction of common pull exercised by the wind-driven masses of ice. By reason of friction the motion will be communicated to lower layers of the sea. This cause of surface currents is of importance to the theory of movement of those polar waters which, for several months after the winter ice begins to break up, are free from larger wind-waves. Deprived of its chief sails, the Labrador current, always sensitive to wind conditions and at times subject to temporary reversal with contrary winds, yet preserves and perhaps exceeds, during the period of ice-drift, the average velocity of current-flow for the year.

NOMENCLATURE OF TERMS USED IN ICE NAVIGATION.

A USEFUL 'list of some of the terms used in ice navigation by whalers, sealers and others' has been prepared by Commander William Wakeham, of the Canadian Marine and Fisheries (Report of the Expedition to Hudson Bay and Cumberland Gulf in the steamship *Diana*, 1897, Ottawa, 1898). Among the terms, the following are here noted with their definitions as expressed by Commander Wakeham:

Floe—A large mass of floating ice.

Pan—A small floe or small piece; one that can be forced aside or slewed.

A field—A large body of ice that may be seen around.

Land floe—Ice frozen fast to the shore.

Collar ice—Is the margin of ice frozen fast to an island or shore, presenting an abrupt wall against which the floating ice rises and falls with the tide.

Growler—Is a more or less washed and rounded lump of ice which rolls about in the water, formed from broken up bergs or detached pieces of heavy old Arctic floe ice. [So called from the sound of heavy churning as the swell breaks at the undercut portion of the pan.]

Packed ice—Are small pieces closed together and held by the pressure of ice and currents.

Batture—Rafted ice [described on page 12 of the report].

Pressure ridge—Is the ridge or wall thrown up while the ice has rafted.

Slack ice—Is detached, so that it may be worked through. Ice is said to be slacking when it begins to be open so as to be navigable.

Running abroad—Ice is said to be running abroad when it opens out or slacks away so as to be navigable.

A nip—Ice is said to be nipping when it begins to close by reason of the action of winds or currents, so as to prevent the passage of a vessel.

Calving—Ice is calving when the small pieces break off from the bottom and rise to the surface of the water.

Slob—Is snow afloat and forming into ice.

Sish—Is thin young new ice, just formed in thin sheets.

Lolly—Is loose new ice.

Porridge ice—Is small, finely ground up ice.

Rafting—Occurs when two pans meet by force either by the action of wind or currents; the edges are broken off and either rise on top of or pass under the body of the pans.

A lead—Is a strip of navigable water opening into the pack.

Slatches—Are considerable pools of open water in the ice.

Swatch—Is a small pool of open water in the ice.

Wash—Is the sound of the sea breaking against ice.

Rote—Newfoundland term for wash.

Water sky—Is a dark or bluish appearance of the sky indicating open water beyond the pack.

REGINALD A. DALY.
HARVARD UNIVERSITY.

AMERICAN ELECTRICIANS IN LONDON.

THE Central London Railway, the 'Electric Underground,' of London, the 'two-penny tube,' is one of the most important and, in some respects, far the most remarkable example of the work of the American electrician and engineer in Europe, perhaps in the world. It is a subterranean road running from Shepard's Bush, at the west, to the Bank in the city. It was opened last June by the Prince of Wales. Its 5¾ miles of route have seen the expenditure of about $15,500,000 during the four years of construction, and many minor bits of work remain to be performed. The original engineer of the work was the late Mr. T. H. Greathead. It was found necessary to come to the United States to secure its exceptionally large and powerful machinery and motive power. It is, in fact, an American electric railway in operation in London, the center of the brains and business of Great Britain. In one respect at least, however, it is novel as to its roadbed: