Pylaie first described them. Interesting specimens of *Agarum, Alaria, Porphyra, Gloiosiphonia,* etc., were exhibited, the *Agarum* from a deep tide-pool at Digby covered by thirty feet of water at high tide. Corallines attain great beauty in these northern waters, and with the attendant brown rockweeds and lustrous kelps lend great richness and diversity of color. The dulse gatherers were found to distinguish and prefer the dulse growing on *Laminaria* to that attached to rocks. Dulse gathering at Pictou forms a business of considerable importance; the dried dulse is put up in barrels to be sold in Boston and latterly in New York.

A third communication, by Dr. MacDougal, consisted of the exhibition and discussion of a specimen of *Ephedra,* one of two species collected by him in his recent trip to Arizona. This remarkable leafless relative of the pines produces palisade cells along its stems instead of leaves. A living cutting about three feet high was shown resembling Scotch broom in its multitudes of long green and brown branches.

Dr. MacDougal also exhibited a remarkable Arizona plant, perhaps an *Ipomœa,* with large swollen discoid base about fifteen inches in diameter, to which short roots were still attached. He had also collected there the tree *Ipomœa* known as the 'Palo Blanco' tree, on which deer browse; it bears a few flowers all the year round, but the leaves disappear after the rainy season. Edward S. Burgess,

Secretary.

UNIVERSITY OF WISCONSIN SCIENCE CLUB.

At the meeting of the Club held on April 1, Professor R. W. Wood, of Johns Hopkins University, addressed the Club on the subject 'A Suspected Case of the Electrical Resonance of Minute Metal Particles for Light Waves,—A New Type of Absorption.'

Small pieces of sodium, lithium or potassium heated in air-exhausted glass bulbs deposit on the cold wall of the bulb in the form of a film which shows colors by transmitted light as strong as those produced by the aniline dyes. The color does not seem to depend on the thickness, and all attempts to explain it by the well-known principles of interference have been without success. The microscope shows that the deposit is made up of exceedingly minute grains, which are but just barely visible under a one twelfth inch oil immersion objective. Their diameter is not far from .0002 mm. The colors vanish on the admission of the smallest trace of air. They change in a most remarkable manner if the outside of the bulb be touched with a small piece of ice, or if the glass be locally heated. The change of color produced by the application of ice to the outside of the bulb is always in the direction corresponding to a drift of the absorption band towards the red end of the spectrum. A purple film which has an absorption band in the yellow becomes blue-green when cooled, the absorption band moving into the red.

The cause has been found to be a condensation of the traces of volatile hydrocarbons (derived from the metal) on the colored film, thus immersing the particles in a fluid of high dielectric constant, the effect of which would be to increase the capacity of the system, lower the period of vibration, and move the region of absorption towards the red end of the spectrum. This was proved by forming the film in one half of a double bulb and immersing the other half in solid CO_2 and ether, thus bringing down all the hydrocarbon vapor. The colored film was found to be no longer sensitive to the local application of ice. It became sensitive, however, as soon as the lower bulb was removed from the freezing mixture and warmed. Sometimes the film becomes nearly colorless when cooled, the absorption band moving out of the visible spectrum entirely. Films originally pale apple green become deep violet when cooled, the color being as deep as that of dense cobalt glass. Various experiments have been tried with polarized light at different angles of incidence.

The paper will appear in full in the *Proceedings of the London Physical Society* and the *Philosophical Magazine.* C. K. Leith.

DISCUSSION AND CORRESPONDENCE.

THE MATHEMATICAL THEORY OF THE TOP.

To the Editor of Science: 'The Mathematical Theory of the Top,' kindly communicated for me by Professor Barus to Science of

December 20, 1901, is simplified much further by noticing that, as the velocity of H is $Wgh \sin \vartheta$ perpendicular to the plane OGK, the hodograph of H (turned backwards through a right angle) is similar to the projection on a horizontal plane of the path of a point C on the axis of the top; and thus

$$Wgh \sin \vartheta e^{\psi i} = -i \frac{d}{dt}(\rho e^{\pi i})$$

by which the vector of the projection of C is derived from the herpolhode curve described by the vector OH of resultant angular momentum by means of a simple differentiation; and this holds for the general top, not merely the symmetrical. I take this opportunity of calling attention to some misprints:* as μ for u, and p for the Weierstrassian symbol in equations (32) to (40).

A. G. GREENHILL.

ORDNANCE COLLEGE,
WOOLWICH, ENG.,
April 7, 1902.

STEINER'S 'LOST' MANUSCRIPT OF 1826.

IN 1826 Steiner announced that he had a manuscript, 'Über das Schneiden (mit Einschluss der Berührung) der Kreise in der Ebene, das Schneiden der Kugeln im Raume und das Schneiden der Kreise auf der Kugelfläche,' ready for print. The subject of this paper, treated by a mathematician like Steiner, has always been considered as of fundamental importance for the development of the geometry of the circle. Since the death of Steiner (1863) until recently, all efforts of recovering this celebrated manuscript were in vain. In 1896, on the occasion of the centennial celebration of Steiner's birthday, in Bern, Dr. Bützberger found a box in the garret of the library of the Naturforschende Gesellschaft in Bern, containing several manuscripts of Steiner, *among which was also the one supposed to be lost.*

This fact is also interesting in connection with Professor Fiedler's (Zürich) investigations on cyclography for which he received the Steiner prize from the Berlin Academy of Science. In a recent letter to the writer, Fiedler remarks that he was in possession of the principles of cyclography (treatment of geometrical problems by means of circles) already in 1863, and that he waited for the publication of Steiner's collected works by Weierstrass in 1881, because he expected to find in it said paper and Steiner's corroboration of his (Fiedler's) results by a similar method. The inspection of Steiner's manuscript, found in 1896, shows however that it does not contain the slightest trace of Fiedler's method. Fiedler is therefore the founder of cyclography.

UNIVERSITY OF COLORADO. ARNOLD EMCH.

AN UNPUBLISHED LETTER BY RAFINESQUE.

TO THE EDITOR OF SCIENCE: During the residence of C. S. Rafinesque in Sicily, after his first four years' stay in America, he was in frequent correspondence with American botanists. From them he constantly sought for collections of local plants, offering Sicilian and other European plants in exchange. The letters were written by Rafinesque during the period of greatest mental strength and activity, and hence seem to illustrate certain phases of his mental life in a most interesting and instructive manner. Letters of this period seem to be quite rare and the following, presented me in copy by Mr. Curtis G. Lloyd, of Cincinnati, with permission to use it as I should wish, seems to well illustrate in the case of Rafinesque his methods of enriching his own herbarium. So far as I have any information in the matter, Rafinesque always fully repaid these exchange debts—thus setting a most commendable example to others who may be 'less eccentric' than the Sicilian botanist. The letter was written to Dr. Manasseh Cutler, then of Massachusetts, but more recently of Ohio, and seems to confirm our general view that Rafinesque was an inveterate collector and that he used every known honest means to increase the number of sheets in his herbarium. The letter was written in 1806 and is interesting of itself. I send it to you, thinking some readers of SCIENCE may be interested in it through their knowledge of the 'eccentric naturalist.'

BROOKLYN, N. Y., R. ELLSWORTH CALL.
March 29, 1902.

PALERMO, *2nd May, 1806.*

Dear Sir:—

I confirm what I had the pleasure to write

* These have already been corrected (see SCIENCE, XV., p. 440).—EDITOR.