type is the result of a long struggle for existence between different species, in which only those possessing the greatest vitality and best fitted to the physical conditions of situation succeed in occupying the ground and form tree associations having a distinct physiognomy. One of the most important characteristics of a forest type is its stability, its resistance to invasion by other plant forms. * * *"

THE FOSSIL ARACHNIDA OF BOHEMIA.

WE are indebted to Professor Dr. Anton Fritsch for another important contribution on the Permian and Cretaceous fauna of Bohemia entitled 'Neue Fische und Reptilien.' This takes the form of a quarto appendix to his previously published volumes, and is illustrated by nine plates. The Cretaceous forms described are new teleosts, plesiosaurs, mosasaurs and pterosaurs.

In 1904 there appeared from the pen and brush of this ardent paleontologist a fine monograph on the Paleozoic arachnida, consisting of eighty pages of text and fifteen plates. The conclusions reached in this monograph are most striking, especially as to the very great antiquity of modern forms. The author observes "If we examine the entire series of the forms described we must recognize that there are many which present no very striking differences from the Arachnida of to-day. They are to be regarded as the direct ancestors of families now existing in part as lateral branches which have later become extinct." This is true of members of six families described. The scorpions of the Silurian period show in their foot structure a primitive form suggesting that of the Crustacea whereas those of the Carboniferous and Permian formations exhibit close resemblance to the foot structure of the modern types.

H. F. O.

EXTENDED EXPLORATIONS OF THE ATMOSPHERE BY THE BLUE HILL OBSERVATORY.

ACCOUNTS of the first experiments in this country with *ballons-sondes,* for the purpose of ascertaining the meteorological conditions at great heights above the American continent, appeared in SCIENCE, Vol. XXI., pp. 76–77 and 335. During the months of January, February and March, 1905, nine more ascents were made from St. Louis and every balloon but one was found and, with the attached instrument, was returned to Blue Hill in accordance with the instructions on each. Like the previous balloons, all of these fell within the eastern half of a circle having its center at St. Louis and a radius of 285 miles. The German expanding rubber-balloons, filled with hydrogen generated by the vitriolic process, were again employed, as were the French self-recording instruments, which gave at least partial records of barometric pressure and air-temperature in seven of the nine ascensions, although another record was obliterated by the finder. On January 25, when a high barometric pressure prevailed at the ground, a temperature of —111° F. was recorded at the height of 48,700 feet, this being one of the lowest natural temperatures ever observed. The experiments last winter were conducted by Mr. Clayton, under the direction of Mr. Rotch, and their success induced Professor Langley, secretary of the Smithsonian Institution, to grant Mr. Rotch $1,000 from the Hodgkins Fund, in order to continue the experiments this summer at St. Louis. These, like the first, will be conducted by Mr. Fergusson, of the Blue Hill Observatory staff. Soundings of the atmosphere made at different seasons should reveal the annual variation of temperature at great heights above the American continent, which is at present unknown.

However, kites are not neglected at Blue Hill, for, besides the flights made there each month on the days fixed by an international committee, they are also being employed to ascertain the conditions above the Atlantic Ocean in the trade-wind region. Thus the investigation which was first proposed by Mr. Rotch in SCIENCE, Vol. XIV., pp. 412–413, and which has been persistently advocated by him since, is now in progress, and this was rendered possible through the cooperation of the well-known French meteorologist, M. L. Teisserenc de Bort, who placed his steam-yacht at the disposal of Mr. Rotch, on condi-

tion that the latter should share the expense of the cruise. Accordingly, on June 3, Mr. Clayton sailed from Boston for the Mediterranean on board the White Star steamer *Romanic,* equipped for raising self-recording instruments with kites, as was first done in 1901 by Messrs. Rotch and Sweetland, whose experiments on a voyage from Boston to Liverpool are described in SCIENCE, Vol. XIV., pp. 896–897. A despatch from Mr. Clayton, at Gibraltar, announced that flights had been made on six days and a mean height of 3,000 feet attained. The results of aerial soundings in the region of permanent high pressure around the Azores, and near the northern limit of the northeast trades, are expected to prove of special interest. At Gibraltar, Mr. Clayton is to embark on the *Otaria,* a yacht of 350 tons and capable of steaming eleven knots, which its owner has already employed for kite-flying in European inland waters. The boat will proceed south, touching at Madeira, Canary and Cape Verde Islands, and perhaps go as far as St. Paul, near the equator, returning by a more westerly course to the Azores, the whole voyage occupying about six weeks. On this route the northeast trade-winds and doldrums are traversed and the southeast trades entered. Should there be too little wind, either at the surface or higher up, the speed of the vessel will enable the kites to rise, and, should the wind at any time be too strong, by steaming with it the pull of the kites can be moderated. By this method it is hoped that all the strata up to a height of 15,000 feet or more will be penetrated, so that their condition as regards temperature, moisture and wind may be investigated. Besides determining the depth of the northeast trade-wind, the supposed southwest, or return trade, which has only been observed on the Peak of Teneriffe, will be sought and its height above the ocean in different latitudes measured, but in case the kites do not reach a sufficient altitude, it is proposed to liberate small balloons from Madeira and observe their change of direction as they rise. Professor Hergesell, on board the Prince of Monaco's yacht, executed last summer a series of kite-flights in the region between Spain, the Canaries and the Azores, without encountering the upper anti-trade, as was mentioned in SCIENCE, Vol. XXI., p. 464. The present expedition expects to make similar soundings in these and lower latitudes and will attempt to extend them to greater heights.

REGULATIONS GOVERNING THE SIXTH INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY.

THE sixth International Congress of Applied Chemistry, under the patronage of His Majesty the King of Italy, will be held at Rome in the spring of 1906. The president of the committee of organization is Professor Emanuele Paterno, Via Panisperna, Rome, and the secretary, Professor Vittorio Villavecchia, Central Customs Laboratory, Rome. All who are interested in promoting the applications of chemistry are eligible for membership in the congress. Active members are those who signify their desire to be such to the general secretary either before the opening of the congress or during its session, and who send the subscription fee, twenty francs. Donating members comprise those persons or societies who contribute the sum of at least one hundred francs or lire. Those who give a thousand lire or more belong to the list of patrons.

The congress is divided into the following sections and subsections:

1. Analytical chemistry, apparatus and instruments—president, Pietro Spica, professor of pharmaceutical chemistry in the University of Padua.

2. Inorganic chemistry and industries related thereto—president, Luigi Gabba, professor of technical chemistry in the Higher Technical School, Milan.

3. Metallurgy and mining, explosives; (*a*) metallurgy and mining—president, Ettore Mattirolo, Geological Survey, Rome; (*b*) explosives—president, Cav. Guiseppe Ninci, colonel of artillery, superintendent of powder of Fontana Liri.

4. Organic chemistry and industries related thereto; (*a*) industry of the organic products —president, Giacomo Ciamician, professor of general chemistry in the University of Bo-