charum Marshall for the sugar maple (not *A. saccharinum* Wang). In both numbers the illustrations are of the high order of the preceding *Heften*.

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NOTES ON INORGANIC CHEMISTRY.

THE first two numbers of the *Zeitschrift für Electrochemie* for January contain an experimental investigation by F. Haber and R. Geipert on the preparation of aluminum. The authors used as a crucible a block of coal 245×245×175 mm., the opening having a diameter of 113 mm. at the bottom, 138 mm. at the top, and 70 mm. deep. This crucible served as a kathode, and a rod of coal 66 mm. in diameter as anode. The bath consisted of an artificial cryolite containing somewhat less than the theoretical amount of sodium fluorid, and in this pure alumina was dissolved. The most favorable current was 3 ampères per square centimeter at 7 to 10 volts. Under these conditions the electrolysis proceeded as smoothly and regularly as in the ordinary electro-analytical precipitation of a metal. Although the density of the solid bath is slightly greater than that of aluminum, when fused it is slightly lower. If, however, too much alumina is dissolved in the bath, it becomes too dense and the aluminum, instead of sinking, floats, often short-circuiting the current. A higher percentage of aluminum fluorid than is present in natural cryolite is advantageous, as it renders the bath more fusible. The output varied from 50 to 55 per cent. of that theoretically required by the current. The aluminum prepared was of particularly pure quality, and in the opinion of the authors the production of the same quality on a large scale is possible by the use of pure materials and an anode low in ash. It was found necessary to add fluorid to the bath from time to time to replace that which is lost by a gradual volatilization.

The modern manufacture of tin foil is described by Rafael Granja in the *Journal* of the Society of Chemical Industry. Three varieties of tin foil are on the market: pure tin foil, composition foil, and Dutch leaf. The composition foil consists of lead, covered on both sides with a thin coating of tin, while the Dutch leaf is prepared from an alloy of tin with a few per cent. of a secret metallic composition. The grade of fineness of the foil is expressed by the number of square inches which a pound of the foil will cover. Thus the limit reached by the thinnest pure tin foil is 10,000, by composition foil 7,000, while Dutch leaf reaches 14,000 square inches. The manufacture of the foil, and also of the capsules for the tops of bottles, is fully described in the paper.

FROM the Physiological Laboratory of the Veterinary High School of Vienna comes a contribution, which indirectly contributes to our knowledge of the occurrence of iodin in soils, and especially with reference to the question as to whether it is largely confined to those soils which are near the sea. On examining the thyroid glands of sheep from different Hungarian localities, Wohlmuth finds that the percentage of iodothyrin—0.2–0.35 per cent.—is approximately the same as that found by Baumann in German and French sheep, and that the iodothyrin contains about the same amount of iodin—3.2–3.3 per cent.—as that obtained by Baumann. The sheep from these far-inland localities must therefore have found in their food the necessary quantity of iodin for a normal amount of normal iodothyrin.

THE work of Liversidge on the crystalline structure of metallic nuggets has already been noticed in these columns. This work has been continued by the examination of a number of new specimens. The structure is studied by etching a polished surface of the metal. In nuggets from Lake Superior containing both silver and copper, it appears that the silver has been deposited upon the copper. Gold nuggets from the Klondyke present a structure and appearance quite different from those of any other locality. They are very pale in color, owing to the large quantity of silver present. An assay of two specimens gave only sixty-five per cent. of gold. In the case of silver and copper nuggets, as has been found with those of gold and platinum, there is every indication that the metal has been deposited

from solution, and there is nothing to indicate that the nuggets have undergone either igneous or hydrothermal fusion.

IT is not often that there is an opportunity to determine the changes in a well water extending over a long period of years, but this has been done by W. W. Fisher in the case of the water of the Trafalgar Square well. He prints in a recent number of the *Analyst* an analysis just made of this water, comparing it with analyses made in 1848 and in 1857. These analyses show that the character of the water has not changed essentially, although the quantity of potassium salts has diminished quite decidedly. In this connection the author calls attention to the fact that alkaline waters are drawn not only from the chalk under the London clay, but also from other deep limestones, and draws the conclusion that the alkali salts present come from the chalk itself and not from percolation. In covered deposits where no natural drainage is possible, the chalk is found to contain soluble salts, distinct traces of sodium carbonate, chlorid and sulfate being found in chalk beneath London at a depth of 500 and 800 feet.

J. L. H.

RECENT ZOOPALEONTOLOGY.

FRITSCH'S 'FAUNA DER GASKOHLE UND DER KALKSTEINE DER PERMFORMATION, BÖMENS.'

DR. ANTOINE FRITSCH, of Prag, has recently issued a complete list of his publications extending back to the year 1851 and covering essentially the broad field of his zoological and paleontological observations. His most monumental work is on the primitive fishes, amphibians and reptiles of the Permian period described in a series of monographs under the title cited above, beginning in the year 1880.

The first monograph covers the long-bodied stegocephalian amphibians of the order Aistopoda; this was continued with the description of the short-bodied forms resembling the modern perennibranchiates in 1884. More advanced labyrinthodonts were described in 1885, the amphibian division of the fauna being concluded in 1887.

The second volume is mainly devoted to the lung fishes, or Dipnoi, and to the more primitive types of selachians. Most important of these types is the genus *Pleuracanthus* which bridges over the gap in fin-structure between the American genus *Cladoselache,* as described by Newberry and Dean, and the fin of the modern shark. This transition form completely disestablished the archipteryial theory of Gegenbaur and established the fin-fold theory of Thacher and Balfour. The other primitive selachians were concluded in 1893, and the great modern actinopterygian types corresponding to Agassiz's ganoids were covered in the parts which appeared during the succeeding two years.

The fourth volume, of which three parts have appeared between 1899 and the present time, is devoted to the insects of the Permian period, especially the myriopods and arachnoids. Finally, this monographic series is brought to a close in 1901 by the third part of the fourth volume which covers the crustaceans and molluscs. This series of monographs will constitute the greatest monument to its author. Also, those who visit Prag find there to their surprise that this Bohemian city contains one of the most beautiful zoological museums in the world, developed under the direction of this veteran zoologist.

H. F. O.

GRAVITY ON THE OCEAN.

THE proceedings of the Academy of Sciences of Berlin of February 13, 1902, contain a paper by Professor F. R. Helmert on Dr. Hecker's determination of gravity on the Atlantic Ocean. In July and August, 1901, the International Geodetic Association entrusted Dr. Hecker, of the Potsdam Geodetic Institute, with the duty of making relative gravity observations on the Atlantic Ocean on a voyage between Hamburg and Bahia. The method employed was to determine the pressure of the atmosphere by means of a barometer and a hypsometer (boiling point thermometer). The barometric formula contains a term depending on the intensity of gravity at the place where the observation was made. The hypsometer is independent of this influ-