

NOTES ON INORGANIC CHEMISTRY.
NEW BORIDS.

AMONG the compounds which the high temperature of the electric furnace has rendered easy of preparation are the borids of the metals, few of which were known until within the last decade or so. Moissan has described the borids of the alkaline earths, of iron, nickel, and cobalt, and of carbon and silicon. In the last number of the *Journal of the Chemical Society* Tucker and Moody recount the preparation of the borids of chromium, molybdenum and tungsten, and of zirconium. All were made by heating the mixed elements in the electric furnace, and are crystalline bodies of great hardness; they are but slightly attacked by hot concentrated acids, except that the molybdenum and tungsten borids are vigorously acted on by hot aqua regia. The formulas obtained by analysis are, CrB , Mo_3B_4 , WB_2 , and Zr_3B_4 . The authors suggest that as a consequence of their high fusing point, hardness, and good crystallization, it is quite possible that some of these and other borids may prove to have industrial uses.

ETHYLENE FROM INORGANIC SOURCES.

In a recent *Journal of the Society of Chemical Industry* the same authors describe the production of ethylene from inorganic sources. Since calcium carbide when treated with water evolves acetylene, and aluminum carbide evolves methane, it was hoped that a mixture of these carbids would give ethylene, but this was found not to be the case; only acetylene and methane were obtained. When, however, a mixture of barium silicide, which evolves hydrogen, with calcium carbide is decomposed by water, ethylene is present in the evolved gases to the extent of two per cent. If barium carbide is substituted for the calcium carbide, the gases contain up to fifteen per cent. of ethylene.

ORGANIC ARAGONITE AND CALCITE.

A NEW reaction to distinguish between aragonite and calcite is given by W. Meigen in the *Centralblatt für Mineralogie*. The finely powdered substance is boiled for a few moments with a dilute solution of cobalt nitrate. In the presence of aragonite a lilac

red precipitate of basic cobalt carbonate is formed, while calcite remains uncolored even after prolonged boiling, or is occasionally colored yellow. Magnesium carbonate is also unchanged in color and calcium phosphate gives a blue precipitate. Using this diagnostic reaction upon shells, corals, and other animal remains, both recent and fossil, the author gives long lists of those consisting of aragonite and calcite respectively. No rule of distribution is apparent from his lists; most orders, recent and fossil, are represented in both classes. The larger number of corals are aragonite, but corallium and tubipora are calcite; the outer shell of trigona is calcite while the inner shell is aragonite; the argonauts are calcite but nautilus and sepia are aragonite; hens' eggs are calcite.

UTILIZATION OF FLUORIN FROM FERTILIZER PLANTS.

WHEN natural phosphates are decomposed by sulfuric acid in the manufacture of superphosphate fertilizers, there is a considerable quantity of hydrofluoric acid set free as such, or as fluoride of silicon. This is especially the case when apatite is used; indeed this fact detracts very materially from the value of the immense apatite deposits of Canada. In Germany manufacturers are compelled by law to prevent the escape of these deleterious gases into the atmosphere and efforts are being made to utilize the waste product. By leading the gases through water, fluosilicic acid is formed and from this solution sodium fluosilicate or magnesium and aluminum fluosilicates may be readily prepared. The last two have some use in hardening calcareous stone. More recently it has been discovered that fluosilicic acid has strong antiseptic properties and that as a preservative of manure it surpasses plaster, kainite or superphosphate of lime. The denitrifying action of bacteria is checked, preventing the loss of nitrogen. The greatest difficulty in the way of its adoption for this purpose is its preparation in suitable form. The aqueous acid in bottles would hardly be acceptable to the farmer and no satisfactory absorbent of the acid has been found. A patent for a new manure preservative has recently been taken out, in which the fluosilicic acid

is incorporated with clay, with the bases of which it for the most part combines. With this powder goes another consisting of a porous substance saturated with sulfuric acid. A small quantity of each powder is scattered over the manure pile and by the action of the sulfuric acid on the fluosilicates fluosilicic acid is generated which acts as an antiseptic. In describing this process in the *Chemiker Zeitung* C. Elschner suggests that it would be more economical to absorb the gases directly by lime and then dry the calcium fluosilicate formed, and that a powdered bisulfate could be more advantageously used than sulfuric acid. Should some practicable method be devised for utilizing these noxious gases it would give great value to many apatite deposits which contain too much fluor spar to be utilized at present.

A GYPSUM WEATHER-SCALE.

AROUND the 'Stone Gallery' at the base of St. Paul's Cathedral is a balustrade of Portland stone, surmounted by a heavy coping of the same material. All of the stone is greatly weathered and coated with a gray or black deposit, much resembling boiler scale. Under the coping this attains a thickness of three-quarters of an inch. An examination of this deposit is given by E. G. Clayton in the *Proceedings* of the Chemical Society. It contains no fungoid matter, and contrary to expectation no carbonates were found in it. It is essentially calcium sulfate, with a small amount of silica. Since there is no neighboring source of sulfates the conclusion is reached that it has been formed by two centuries' solvent and weathering action of rain, charged with sulfurous and sulfuric acids derived from the gases and smoke of innumerable surrounding chimneys. The rain water, running and dripping from the under side of the coping stone, has here left an especially thick deposit, which presents a curiously close resemblance to a deposit of calcareous tufa.

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CURRENT NOTES ON PHYSIOGRAPHY.

PHYSIOGRAPHY OF WISCONSIN.

COLLIE has contributed two articles on the physiography of his State. The first ('Physi-

ography of Wisconsin,' *Bull. Amer. Bureau Geogr.*, II., 1900, 270-287) is a general and elementary account, giving fuller statement of features due to glacial action than to those determined by the underlying rock. The second ('Wisconsin shore of Lake Superior,' *Bull. Geol. Soc. Amer.*, XII., 1901, 197-216) is the result of detailed local study, with special reference to shore features in the neighborhood of the Apostle Islands. These islands consist of horizontal sandstones, usually cliffed and caved along the waterline, but also modified by bars and spits, of which the largest encloses Chequamegon bay.

In both these papers the bluff by which descent is made from the northwest border of the uplands of disturbed Keweenaw rocks to the lower land of horizontal sandstones bordering Lake Superior is described as a fault scarp, 'formed by the movement of rocks one upon the other, * * * particularly noticeable because it is not formed, as most of the Wisconsin cliffs are, by erosion.' This interpretation of the recency of the fault is novel. The considerable erosion indicated by the truncation of the upturned edges of the sandstones near the fault line throws some doubt upon the accuracy of Collie's view; should it be proved correct the scarp would be an interesting addition to our physiographic types, for faults that are young enough to preserve something of their initial topographic expression are rare in the eastern half of our country.

GLACIAL EROSION IN SKYE.

THE laccolithic mass of the Island of Skye, west of Scotland, was deeply dissected in pre-glacial time. During the glacial period, its mountains bore local glaciers, whose eastern members stemmed the great ice sheet that came westward from the Scotch highlands, dividing it into two parts which flowed northwest and southwest out to sea. The effects of the Skye glaciers as agents of erosion have lately been studied by Harker ('Ice Erosion in the Cuillin Hills, Skye,' *Trans. Roy. Soc. Edinburgh*, XL., 1901, 221-252, map). He finds that the floors and walls of the ice-scoured valleys exhibit much less relation to rock structure than is usual in districts of