in Limestone County. The samples analyzed by him contained from 15 to 20 per cent. of phosphoric acid up to 36 or 37 per cent.; and he also showed a sample of superphosphate prepared by him from this rock, the manufactured article containing 13.15 per cent. water—soluble, 0.15 per cent. reverted, and 1.24 per cent. insoluble; total 14.9 per cent. phosphate.

In the discussion which followed, Mr. Aldrich said that a fertilizer manufactory in Meridian was using lignite from the Burning Cut in Sumter County, Ala., as a filler, and that it contained 1.5 to 2.0 per cent. ammonia. Mr. Aldrich had formerly sold from the Blocton mines several hundred tons of coal slack, to a Shreveport company, for the same uses. He also mentioned the fact that he had recently examined a lignite occurring in Mississippi, 17 miles west of Starkville, which had only 4.5 per cent. of ash and which made a very good coke.

Dr. Smith then read a preliminary report of the mineral statistics of Alabama for the second and third quarters of the current year; after which, there being no other business before the meeting, it was adjourned *sine die*.

EUGENE A. SMITH,
Secretary.

DISCUSSION AND CORRESPONDENCE.

DR. WILSON'S REPLY TO HIS CRITICS.

I CONSIDER it complimentary to an author that his works should be criticised. It shows that they are worthy of attention and consideration. The friendly criticism in SCIENCE, December 22d, of my address delivered in Columbus last August, before the Section of Anthropology of the A. A. A. S., appears under such misapprehension as seems to require a word of explanation. That address, as its title indicates, was 'A History of the Beginnings of the Science of Prehistoric Archæology.' It was a *résumé* or description of the discoveries made, or alleged to have been made, which led to the foundation of the science, and a statement of the theories advanced for its establishment. This being its purpose, it was proper that I should treat of all its topics, and this without binding me to an approval of them. I was recording a history of the science, not necessarily maintaining the truth of all the theories advanced by its founders. The friend who wrote the criticism seems not to have recognized the difference. He makes strenuous opposition to the classifications of the science as set forth in my address; but none of them were mine. They had been made in Europe many years since, were applicable to that country, and most of them are still in use there. In such a history as I was writing it would have been highly objectionable for me to have omitted them; and so with most of the other points in the criticism referred to.

THOMAS WILSON.

NOTES ON INORGANIC CHEMISTRY.

AN important practical application of the liquefaction of hydrogen is that of the production of high vacua, as described by Dewar in the *Proceedings* of the Royal Society. At the boiling point of hydrogen the vapor tension of air is less than a millionth of an atmosphere, hence when to vacuum tubes for the spectroscopic examination of gases is attached a temporary tube immersed in liquid hydrogen, the solidification of the air in the tube produces a very high vacuum. In this way the more volatile constituents of atmosphere become concentrated in the tube, and in numerous tests the presence of neon and of helium was revealed in a volume of air less than 50 cc. Some tubes showed a hydrogen spectrum, but others did not, so that the question as to whether free hydrogen exists in the atmosphere cannot be considered as settled.

A LATER number of the *Proceedings* contains a paper by T. G. Bonney on the parent-rock of the South African diamonds. The 'blue ground' of the Newlands mines, which are forty miles northwest of Kimberley, contains rounded boulders of eclogite, and in this eclogite are occasional colorless octahedra of diamond, apparently as an original constituent. As the eclogite boulders are water-worn, it follows that the 'blue ground' is not of igneous origin, but it is true breccia produced by the destruction of various rocks, one of which—the eclogite—has contributed the diamonds to the mixture.

THE analysis of a sample of Egyptian porcelain from Memphis is published by Le Chatelier

in the *Comptes Rendus*. The composition is found to be wholly different from that of Chinese porcelain, and hence it would appear that the manufacture of true porcelain was known to the ancient Egyptians. The duplication of this Egyptian porcelain would require 40 parts blue glass, 50 parts fine sand, and 5 parts white clay.

Le Chatelier has also examined statuettes from Egyptian tombs which were supposed by Salvétat to be carved from a natural grit and then glazed with a sodium-calcium-copper silicate. It appears, however, that the statuettes from several different localities consist chiefly of fine grains of quartz sand, with a little clay as a binding material. The glaze is a mixture of sand with a sodium-copper silicate.

The effect of sulfur, especially as pyrites, in coal when used as a fuel is discussed by Wilhelm Thörner in the *Chemiker-Zeitung*. With such a fuel, not only sulfur dioxid, but also sulfuric acid will be present in the combustion products. Since at least a portion of this sulfuric acid will be deposited upon the boiler walls, tubes, etc., it is necessary that these should be cleaned frequently. The more moisture present, the greater the corrosive action of the acid. If lime is mixed with the coal, the formation or at any rate the deposition of the acid is in large part prevented. The author suggests the use of briquettes made of an intimate mixture of coal with a little lime. With these not only can fine coal screenings, slack, etc., be used, but sulfuric acid corrosion may be practically avoided.

J. L. H.

CURRENT NOTES ON PHYSIOGRAPHY.

In resuming the preparation of these notes after an interruption of a year and a half, it will not be possible to mention all the physiographic essays published in the interval, but the effort will be made to give account of the more important ones in which the readers of Science may be interested, as well as to review current publications.

GLACIAL SCULPTURE IN WESTERN NEW YORK.

Gilbert concludes that the Niagara limestone upland in western New York is chiefly a product of pre-glacial erosion, but that its relief has been increased by the greater glacial erosion of the lowland underlaid by weaker shales on the north, and that its northward-facing escarpment has been modified in detail by glacial action. Where the escarpment faces northwesterly, so that the ice sheet moved about parallel to its front, the outline has been smoothed; where it faces northeasterly, against the ice motion, preglacial irregularities are intensified by glacial scouring. The plain of Medina shale bordering Lake Ontario, and now overspread with drift and lacustrine strata, has a broadly furrowed rock floor, with troughs parallel to the ice motion: here the minimum estimate of the general reduction of the surface by glacial erosion is set at 40 or 50 feet, 10 or 20 times its measure on the limestone upland (Bull. Geol. Soc. Amer., X., 1899, 121-130).

GLACIATED VALLEYS.

The most original physiographic essay presented to the recent International Geographical Congress at Berlin was one by Penck on the over-deepened valleys of the Alps. Not only where large lakes occur near the margin of the mountains, but far inward along the larger rivers, the main valley floors are deepened below the level of the side valley floors and the discordance thus indicated is ascribed to the stronger glacial erosion in the main than in the side valleys. The side streams plunge down into the main valley as waterfalls. This discordance of valley floors at first seems exceptional, characterizing valleys of glacial erosion but not of river erosion: but it was well shown that there is no such failure of analogy. A river of water moves nimbly; its cross section is small and its channel is a small part of its valley; the river bed is usually hidden, and hence, as main and side streams have the same surface level at their junction, we do not ordinarily notice that the bed of the main river channel is deeper than that of a side stream, although this relation must be recognized as soon as attention is turned towards it. A river of ice moves slowly; its cross section is large and its channel is a large part of its valley; ancient glacial channels are now habitually laid bare, and the discordance between the beds of